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ADMINSTRATION AND REGULATION OF A MILITARY RETIREMENT SYSTEM FUNDED BY PRIVATE SECTOR INVESTMENTS

THESIS

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Preface

The purpose of this study was to investigate investment of military retirement system funds in the private sector, as opposed to the current method of investing the funds within the Government, between 1985 and 1989, under assumptions of administrative and regulatory constraints; this timeframe was selected because in 1985 the Government began setting aside funds for future military retirement costs. The specific goals were to determine the benefits of an MRS funded by private sector investments if assumed administrative and regulatory constraints were taken into account; administrative constraints were determined by using the Federal Employees Thrift Savings Plan as an administrative model; regulatory constraints were determined by using life insurance and private pension regulations as regulatory models. In general, this study revealed that had some or all of the military retirement funds been invested in the private sector between 1985 and 1989, even under assumptions of administrative and regulatory constraints the military retirement system fund could have benefited in terms of increased investment income.

I would like extend my thanks and deepest appreciation to Lt Col Thomas F. Schuppe for his guidance and moral support during the course of this research. I would also like to thank Ms. Alison L. Doone, Deputy Director, Investments, Federal Retirement Thrift Investment Board, for her courteous and prompt responses concerning the administration of Thrift Savings Plan.

Audree D. Newman

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Abstract

The purpose of this study was to investigate investment of military retirement system (MRS) funds in the private sector, as opposed to the current method of investing the funds within the Government, between 1985 and 1989, under assumptions of administrative and regulatory constraints; the timeframe was selected because in 1985 the Government began setting aside funds for future military retirement costs versus the pay-as-you-go method in previous years.

The study had three objectives: (1) identify administrative factors that result from modifying the current MRS to an MRS funded by private sector investments; (2) identify regulatory constraints that could apply to the investment of military retirement funds in the private sector; (3) evaluate the MRS flow of funds under several investment plans that reflect assumptions of administrative and regulatory constraints.

Administrative assumptions were based on the Federal Employee Thrift Savings Plan; regulatory assumptions were based on life insurance fund and private pension fund regulations.

The results from analyzing the MRS flow of funds suggested that between fiscal years 1985 to 1989, a stock

index plan, and to a lesser extent, a corporate bond index plan, improved the cumulative investment returns of the MRS fund; the price for this improvement was periods of volatility resulting in short term losses on investment. A highly regulated plan such as the life insurance plan provided approximately the same investment returns as the current MRS investment approach with no volatility.

The results also suggested that improved investment returns may be achieved when less than 100 percent of the MRS fund was invested in the private sector; this method also reduced the negative effects of a volatile market.

ADMINISTRATION AND REGULATION OF A MILITARY RETIREMENT SYSTEM FUNDED BY PRIVATE SECTOR INVESTMENTS

I. Introduction

Background

The military retirement system (MRS) is a controversial entitlement program that has evolved over the years for the purpose of rewarding and retaining experienced military personnel. Those who oppose the MRS say that it is too expensive to fund and its benefits are excessive; those who support the MRS feel that it is essential for motivating people to make the military a career. The MRS has three direct sources of income (Figure 1): the Treasury Department, whose contribution pays for an approximate $500 billion in debt accrued over the past 40 years; the Department of Defense (DOD), whose contribution accounts for current and future military retirement costs; and finally, returns on the military retirement funds invested in U.S. Government securities (Henry, 1987:11). These interest yielding returns, although helpful in financing the MRS, also increase the national debt. Because funding for the MRS is ultimately the burden of the taxpayers, the high cost to the taxpayers has

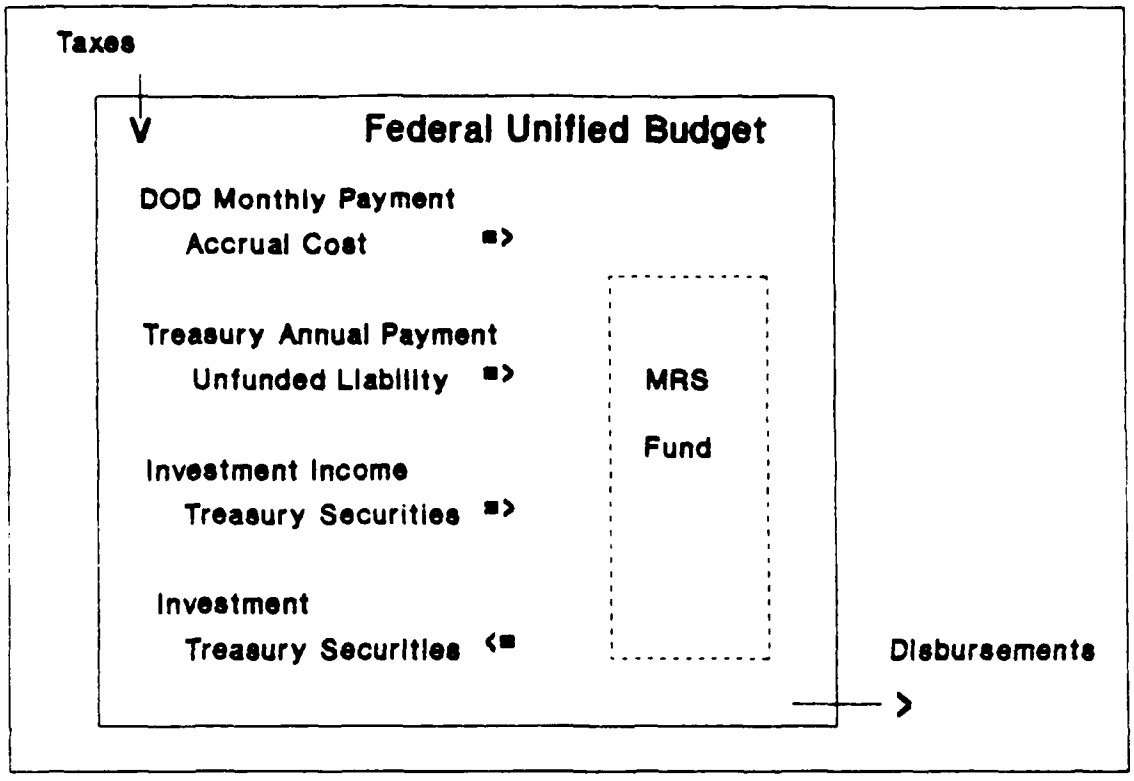

Figure 1. MRS Budget Activity

motivated many studies urging Congress to modify the MRS by reducing benefits to military retirees (U.S Congress, 1984b:33). An approach to modifying the MRS without reducing benefits was offered by Henry in his 1987 thesis, Funding The Military Retirement System: A Private Sector Investment Approach To Accrual Accounting.

As explained in Henry's thesis, the Department of Defense (DOD) is required to pay into a fund each fiscal year that finances future military retirement costs as well as current outlays to military retirees. The DOD Board of Actuaries, referred to as the Board, determines the level of payment, or accrual charge, that the DOD must pay into the account. The

level of accrual charge is determined by the Board based on a "real interest rate" (annual inflation rate subtracted from annual investment return of special issue U.S. Government Treasury securities); the more conservatively estimated the real interest rate, the higher the accrual charge. This results in more of the DOD budget, and subsequently more of the taxpayers' dollars, allocated to the MRS.

Henry's thesis "investigated the possibility of improving the real interest rate assumed by the Board by means of investment of military retirement funds in the private sector" (Henry, 1987:83). Because the MRS is funded through a series of intragovernmental agency debits and credits, versus through the transfer of actual money, the approach used in the study was to assume that the Federal Government, through Treasury issues, taxes, or a combination of issues and taxes could derive the necessary amount of revenue to invest in the private sector to fund the cost (payment by the Treasury Department and DOD) of the MRS. The study then compared various private sector investment plans under different issue/tax combinations to determine if returns from such investment plans exceeded the real interest rate used to determine accrual charges; the risk of negative returns, the effect on the national debt, and the effect on deficit spending were also analyzed. The study concluded that the real interest rate used to determine DOD accrual charges could be improved by several investment plans under each issue/tax combination. However,

> the reward of an improved real interest rate for the investment plans studied is not without implications. First, all of the investment plans pose a riskier option as compared to the current intragovernmental investment. This risk is a function of the variability of the private sector which has the potential for negative growth as well as greater reward when compared to the current MRS. (Henry, 1987:83)

Furthermore, "the plans under each issue/tax combination can, like the present MRS, affect deficit spending as well as the national debt" (Henry, 1987:83). And finally "additional legislation would be required to authorize and outline the administrative and bureaucratic aspects of investing in the private sector" (Henry, 1987:84).

Specific Problem

Under the current MRS, as authorized by Public Law 98-94, payments into the military retirement fund are made through intragovernmental transfers of funds. During this process of debiting and crediting, the transfer of money only takes place when tax revenues are added to the federal budget and when payments from the retirement fund to retirees and other beneficiaries are made.

If the military retirement fund were to be supplemented through private sector investments, Public Law 98-94 would probably have to be modified to establish an agency to monitor the flow of funds and fund activities. Procedures for government allocation of money to an investment firm as well as government receipt of investment income for dispersal to

beneficiaries would have to be outlined. The schedule of payments to the private sector fund and the source of such payments would have to be determined.

Furthermore, the investment firm (or firms) that manages the MRS private sector investment activities may be obliged to follow rules that limit or prohibit the selection of certain types of investments. These rules may specify the maximum percentage of MRS fund investment allowed in stocks, bonds, real estate, mortgages, federal, state or local securities, and other investments. Rules may be designed to preclude conflict-of-interest problems that could result if the federal government was a stock or bond-holder in certain domestic and foreign companies. For example, these rules could severely limit MRS fund ownership of defense industry stock to prevent the appearance of favoritism by the federal government towards any one particular defense contractor; these rules may prohibit investment of MRS funds in certain foreign-owned companies due to the nature of the relationship between the U.S. and the country in which the foreign company is based.

Henry's thesis investigated the effect on savings to the U.S. government by an MRS totally funded by the returns of private sector investments. The study concluded that the real interest rate used to determine DOD accrual charges could be increased by several private investment plans under various Treasury issue and tax combinations, resulting in savings to the Government. Henry's thesis did not investigate the administrative and regulatory factors of an MRS funded by

private sector investments nor the potential effects of these factors on the real interest rate. Also, the study did not investigate the savings to the Government by an MRS that, for administrative or regulatory reasons, was only partially funded by returns of private sector investments.

The problem investigated in this study is to suggest how the MRS fund might be administered and regulated if the fund was supplemented by private sector investments and how these administrative and regulatory factors would impact the benefits of a private sector approach to financing the MRS.

Scope

This research will investigate possible administrative and regulatory constraints on an MRS that is funded by private sector investments and whether the required funding for the current MRS could be attained under these constraints. The determination of administrative constraints will be based on a comparison of the Federal Government's Thrift Savings Plan (TSP), "a retirement savings and investment plan for Federal employees" (Thrift Investment Board, 1989:2), with the potential administrative requirements of an MRS funded by private sector investments. The determination of regulatory constraints will based on current Federal or state regulations governing pension and life insurance funds.

Limitations

This study will not address the history of the MRS. The

reader may refer to Henry's thesis for a review of the evolution of the MRS.

This study will review only the Federal and State level regulations that pertain to investment of life insurance and pension funds. The reader may refer to individual state codes and the Pension and Welfare Benefits Administration for details relating to other regulations on life insurance and pensions.

Research Objective

Given the findings in Henry's thesis, the overall objective of this thesis will be to evaluate the benefits of an MRS funded by private sector investments if assumed administrative and regulatory constraints were taken into account.

Sub-objectives.

1.) Identify administrative factors that result from modifying the current MRS to an MRS funded by private sector investments.

2.) Identify regulatory constraints that could apply to the investment of military retirement funds in the private sector.

3.) Evaluate the MRS flow of funds under several investment plans that reflect assumptions of administrative and regulatory constraints.

II. Review and Development

Overview

This section reviews the current MRS Fund, the private sector funding approach proposed by Henry, the Thrift Savings Plan, and regulations governing investments of pension and life insurance funds. The first sub-section discusses the DOD Military Retirement Fund, as established by Public Law 98-94, Title 10 of the U.S. Code. The second sub-section reviews Henry's work and acts as an introduction to the next sub-section; the third sub-section discusses potentially conflicting administrative and regulatory factors between the private sector funding approach and the system under Public Law 98-94. The fourth sub-section discusses the Federal Employees Thrift Savings Plan to establish baseline administrative procedures for an MRS funded by private sector investments. The fifth sub-section presents current Federal or State level regulations governing investment management of pension or life insurance funds that could apply to an MRS funded by private sector investments. The conclusion of this section ties the preceding sub-sections together to set the stage for forthcoming analysis.

Current MRS Fund

Fund Purpose and Valuation. The Treasury Department, by

law, maintains an account called the Department of Defense Military Retirement Fund, referred to as the Fund; its purpose is for the "accumulation of funds in order to finance on an actuarially sound basis liabilities of the Department of Defense under military retirement and survivor benefit programs" (U.S. Congress, 1983c:61). The Defense Retirement Board of Actuaries, referred to as the Board, manages the Fund and consists of three professional actuaries appointed by the President who

> shall review valuations of the Fund . . . and shall report periodically, not less than once every four years, to the President and Congress on the status of the Fund. The Board shall include in such reports recommendations for such changes as in the Board's judgment are necessary to protect the public interest and maintain the Fund on a sound actuarial basis. (U.S. Congress, 1983c:63)

An actuarial valuation of the military retirement and survivor benefits programs calculates the current and expected future worth of the Fund and must be accomplished at least every four years (U.S. Congress, 1983c:63). If at the time of the valuation there have been previous adjustments in levels of retirement or survivor benefits, the Board may recommend increases or decreases in the contributions made by the Treasury and DOD. The valuation is based on actuarial assumptions pertaining to mortality, military retention, and economic conditions and involves computations of current and expected:

a.) DOD total basic pay,

b.) level of DOD and Treasury annual payments into the

Fund,

c.) amount credited to the Fund resulting from Fund investments,

d.) Fund disbursements to beneficiaries,

e.) and Fund end-of-year balance (Valuation:all).

DOD Contribution. A monthly contribution deducted from the DOD budget pays for current and future military retirement costs under the accrual accounting system enacted in October 1984. The amount designated by DOD for payment into the Fund is based on the product of

> (A) the level of percentage of basic pay determined under the most recent (as of the first day of the current fiscal year) actuarial valuation ...and
>
> (B) the total amount of basic pay paid that month to members of the armed forces (other than the Coast Guard) on active duty or in the Selected Reserve. (U.S. Congress, 1983c:63)

The monthly amount of the DOD contribution to the Fund, although budgeted as MRS funding, is accounted for during the year by the intrafund transfers from "funds available for the pay of members of the armed forces under the jurisdiction of the Secretary of a military department" (U.S. Congress, 1983c:63).

Treasury Contribution. The contribution made by the Treasury Department pays for the debt accrued in the years prior to 1984 when the MRS did not set aside funds for future payouts upon the retirement of military members but rather paid retirees as required; this debt is referred to as the

Fund's unfunded liability. The amount of payment is made available directly from the Treasury's General Fund (U.S. Congress, 1983c:64), the depository of all Government revenues from which Federal agencies are financed (Moraglio, 1986:22). The yearly contribution made by the Treasury Department is based on an amortization schedule created by the Board of Actuaries in 1984 when accrual accounting was implemented. This amortization schedule may be adjusted by the Board during a Fund valuation, due to changes in retiree or survivor benefits (for beneficiaries under the pre-1984 MRS) that increase or decrease the Fund expenses.

Investment of Fund Assets. Funds in the MRS budget that are not paid out to beneficiaries are held by the Treasury in the form of special issue Federal debt securities. These treasury issues are special in the sense that they cannot be bought or sold in the public financial market (Moraglio, 1986:93). The maturities of the MRS Fund investments are based on the DOD's determination of Fund financial requirements and bear interest "at rates determined by the Secretary of the Treasury, taking into consideration current market yields on outstanding marketable obligations" (U.S. Congress, 1983c:65). The returns from the special issue securities and their par values at maturity are credited to the Fund by the Treasury.

Review of Proposed Private Sector Funding Approach.

Purpose of the Private Sector Approach. As discussed

under the sub-section Current MRS Fund, the DOD Board of Actuaries, during a Fund valuation, determines a level of annual payment that the DOD will have to contribute to the Fund to pay for future MRS expenditures. This level of payment, calculated as a percentage of basic pay times the total basic payroll, is referred to as the accrual charge. The determination of the level of accrual charge is relative to the projected expenses, and subsequently the required future worth, of the Fund. The future worth is calculated using a conservative rate of return, the assumed real interest rate (annual inflation rate subtracted from annual investment return of special issue U.S. Government Treasury securities). Because the rate of return of the Fund, based on the real interest rate, is a conservative rate of return with respect to other types of investments, the level of accrual charge must be relatively high to meet projected Fund expenses.

Henry investigated whether the real interest rate could be increased by investing the MRS funds in the private sector rather than in special Treasury issues. If the real interest rate could be increased, then the level of accrual charge could be decreased, resulting in "potential taxpayer savings in terms of the DOD normal cost payment each fiscal year" (Henry, 1987:36).

Assumed Budget Activity. Because the MRS is funded through a series of intragovernmental agency debits and credits, versus through the transactions of actual money (Henry, 1987:32-33), the approach used by Henry was to assume

that the Federal Government, through Treasury issues, or taxes, or a combination of issues and taxes could derive the necessary amount of revenue to invest in the private sector to fund the cost (payment by the Treasury Department and DOD) of the MRS. Table 1, extracted directly from Henry's study, illustrates the differences between the existing unified budget activity and the hypothetical budget activity assumed in his analysis.

Selection of Private Investment Plans. Henry compared various private sector investment plans funded by the Government under 100% Treasury Issue/ 0% Tax, 50% Treasury Issue/50% Tax and 0% Treasury Issue/100% Tax combinations to determine if rates of return from such investment plans exceeded the real interest rate used to determine accrual charges. The selected plans consisted of three specific (funds identified with management firms) and two broad-based (generic investment plans that included common stocks, fixed-income securities, real estate, Treasury issues, or municipal bonds) plans. One of the specific plans represented the highest yielding mutual fund over the period of 1947 through 1978; the second specific plan represented the lowest yielding mutual fund over the same time period; and the third specific plan represented a mutual fund consisting of pension assets (Henry, 1987:48-49). The broad-based plans included: the Wyatt Company Survey, which represented a plan that consisted of various percentages of diverse assets (Henry, 1987:50); and six generic plans developed and evaluated in a study by Brown

Table 1

The MRS Funded Through
Existing Unified Budget Activity
versus
Hypothetical Budget Activity (Henry, 1987:39)

Key: extra => extragovernmental
intra => intragovernmental

Existing Transaction	Hypothetical Transaction
1. Taxes (extra)	1. Additional Taxes and Treasury Issue Income (extra)
2. DOD Normal Cost Payment (intra)	2. Same (intra)
3. Treasury Unfunded Liability Payment (intra)	3. Same (intra)
4. Purchase of special Issue Treasury Securities (intra)	4. Purchase Private Sector Portfolios (extra)
5. Treasury Payments of Interest/Par (intra)	5. Private Payments of Interest/Par (extra)
6. None	6. Commission and Management (extra)
7. Outlays to Retirees (extra)	7. Same (extra)
8. None	8. Outlays to Private Sector for Interest on Treasury Issues (extra)

and Brown (Henry, 1987:51). The generic plans were identified by an index number, with increasing index values representing decreasing risk of negative returns. Table 2 summarizes the plans used by Henry.

Table 2

Summary of Investments Plans
Used in Previous Study (Henry, 1987:48-56)

Plan Number	Time Frame	Composition or Name	Average Annual Yield
1	1947-1978	Index 1: Common Stock	11.79
2	1947-1978	Index 2: Index 1 plus fixed-income corporate issues	9.07
3	1947-1978	Index 3: Index 2 plus real estate	8.26
4	1947-1978	Index 4: Index 3 plus U.S. government issues	7.25
5	1947-1978	Index 5: Index 4 plus municipal bonds	6.97
6	1947-1978	Index 6: Index 5 less common stock	6.08
7	1947-1978	Risk-free Rate (T-Bills)	3.53
8	1947-1978	Investment Co. of America	12.05
9	1947-1978	Investors Selective Fund, Inc.	5.25
10	1953-1985	Wyatt Company Survey	7.8
11	1976-1986	Dean Investment Associates	16.6

The criteria by which any of the above investment plans could be selected to replace the current Fund investment plan were the following:

> The plan must show a competitive annual real interest rate when compared to the real interest rate of 1.6 percent currently assumed by the DOD Actuary. In particular, all distracting factors such as inflation, commission and management, and any interest incurred by Treasury securities that are issued to generate "actual" money for the MRS, must be subtracted from the plan's

nominal return. Thus, after removing the distracting factors, the real interest rate of the plan is revealed.

Secondly, a plan's real interest rate must exceed the actuarial interest rate enough to show an appreciable decrease in the DOD accrual charge. Plans with a rate only slightly better than the presently assumed rate are susceptible to statistical error and, thus, cannot be considered viable candidates.

The final element is that a plan should possess a limited amount of risk. Although the element of risk is difficult to fully define and assess, for this study the notion of risk is considered a function of the variability and composition of the investment plan. Henry, 1987: 54-55)

Computation of Real Returns on Investment Plans. For each investment plan a real return was computed under the three Government issue/tax combinations assumed to finance the MRS private sector fund. Under the 100% issue/0% taxes Government financing method the private investment plan returns were calculated by subtracting from the average annual rates the inflation rate, the commission and management fees, and the full Treasury issue interest rate. (The rationale for subtracting the Treasury issue rate was that the expense to the Government of paying interest on the issues negates some of the benefit gained from investing in the private sector.) Under the 50% issue/50% taxes financing method, the returns were similarly calculated except one-half of the Treasury issue interest rate was subtracted instead of the full rate. Under the 0% issue/100% taxes financing method, the investment returns were calculated as before except a Treasury interest rate was not subtracted at all from the average annual returns.

General Results of Henry's Investigation. The results of Henry's study suggest that the real returns on private sector investments are highest when the Government finances the private sector approach through increased taxes. The reason for this, as explained previously, is that the Treasury issue interest rate is not subtracted from the investment plans' nominal return. Risk of negative returns, measured in terms of variability of rates of return over a period of time, was higher for investment plans that demonstrated high real returns; such plans invested in a relatively high percentage of stock. In Henry's study, plans 1, 2, 8, 9, and 11 demonstrated "two to three times more variability than Plan 7, the risk-free rate of Treasury bills" (Henry, 1987:63). Finally, the accrual charges were shown to be significantly reduced particularly when using Plans 1 and 8; for example, under the 100% issue/0% tax combination, a 1987 accrual charge of $18.8 billion under the current MRS decreased to $4.85 billion under Plan 1 and $3.55 billion under Plan 8 (Henry, 1987:68). However, the plans that showed the greatest decrease in accrual charges also reflected the highest risk of negative returns.

Current MRS Fund Versus a Private Sector MRS Fund.

Introduction. Two points significant for this research were made in Henry's thesis with regard to a publicly funded MRS versus the privately funded MRS:

1. the Government would have to switch from intragovernmental financing of the MRS to that of extragovernmental financing which would require the Government to either issue Treasury securities (thereby increasing the deficit), raise taxes, or both in order to raise the money necessary for private investment;

2. the private sector approach to financing the MRS would require the Government to tolerate the risk of negative returns on investment of Federal pension funds versus the risk-free financial environment MRS funding currently operates in.

Excluding the political and ethical implications of increasing the deficit or raising taxes, the first point could be viewed as administrative, an issue of how the Federal Government would be able to schedule payments from some source to a firm for investing in the private sector. The second point could be viewed from a regulatory perspective, an issue of how the Government might regulate the privately funded MRS to limit the risk of loss on investment. These points will be developed in the following sections.

Administrative Issues. The Federal Government is currently not structured to administer an MRS funded through a private sector investment plan. Under a private sector investment approach, procedures for government allocation of money to an investment firm as well as government receipt of investment income for dispersal to beneficiaries would have to be outlined. A Federal agency more than likely would have to be set up to manage the process as well as oversee the investment firm that manages the MRS assets. As mentioned previously, the schedule of payments to the investment firm for investment and the source of such payments would have to

be determined.

Regulatory Issues. The investment firm (or firms) that would manage the MRS private sector investment activities may be obliged to follow rules that limit or prohibit the selection of certain types of investments. These rules, designed to limit risk, may specify the maximum percentage of MRS fund investment allowed in stocks, bonds, real estate, mortgages, federal, state or local securities, and other investments. Furthermore, rules may be designed not only to limit risk but to preclude conflict-of-interest problems that could result if the Federal government was a stock- or bond-holder in certain domestic and foreign companies. For example, these rules could severely limit MRS fund ownership of defense industry stock to prevent the appearance of favoritism by the federal government towards any one particular defense contractor; these rules may prohibit investment of MRS funds in certain foreign-owned companies due to the nature of the relationship between the U.S. and the country in which the foreign company is based.

A private sector funding approach to financing the MRS, although shown to reduce the cost to the Government, requires a reconciliation between the way the MRS is currently administered and regulated to the way the modified MRS might be administered and regulated; these factors could affect the level of cost reductions obtained by a private sector approach. To achieve a reconciliation, the Federal Government's Thrift Savings Plan (TSP) will be used as an

administrative model to develop an administrative design for an MRS funded by private sector investments; the reason for selecting the TSP is that it represents an existing plan in a Federal pension program that involves investments in the private sector. Following a discussion of the TSP and its relevance to the administration of a modified MRS, regulatory issues that could have an impact on the private sector funding approach will be addressed.

Federal Employee Thrift Savings Plan

Overview of the TSP. The Thrift Savings Plan, established by Public Law 99-335, "is a defined contribution plan administered by the Federal Retirement Thrift Investment Board" (Thrift Investment Board, 1989:2), a government agency that oversees investments of Federal employee retirement contributions into the Thrift Savings Fund. The TSP is a separate plan from the Civil Service Retirement System (CSRS) and the Federal Employees' Retirement System (FERS), which have programs administered by the Office of Personnel Management. The CSRS and FERS plans are "defined benefit programs" (Thrift Investment Board. 1989:2) and require nonvoluntary deductions from employees wages; the retirement benefits from such plans are computed based on employee time in service. The contributions into the Thrift Savings Fund, in contrast, are voluntary and the retirement benefits are based on the amount of employee contributions.

Federal employee retirement contributions into the Thrift

Savings Fund are invested in any one or several of the three investment funds available to TSP participants; each individual employee chooses the funds that his contributions are invested in. The Federal Retirement Thrift Investment Board directly manages the G Fund, which is completely invested in U.S. Treasury securities. The other two funds are the C and F Funds, an equity fund and a bond fund respectively, which are managed by a private professional asset management firm deemed qualified by the Government; the current asset manager is the Wells Fargo Investment Advisors. Individual accounts for all participants are maintained by the U.S. Department of Agriculture's National Finance Center (Thrift Investment Board, 1989:2).

Employee Contributions. Under the Thrift Savings Plan, FERS employees have the option of contributing up to 10 percent of their weekly paycheck to the Thrift Savings Fund; the particular Government agencies that employ the participants contribute to their individual Thrift Savings Fund accounts "dollar for dollar the first 3 percent of pay contributed, and 50 cents on the dollar for the next 2 percent" (Thrift Investment Board, 1989:4). FERS employees also receive automatic agency contributions of 1 percent of basic pay for each pay period whether or not they themselves contribute to their TSP fund (Thrift Investment Board, 1989:7). CSRS participants in the TSP may contribute up to 5 percent of their weekly pay, however they receive no agency matching funds or 1 percent automatic agency contributions

(Thrift Investment Board, 1989:4).

FERS participants in the TSP are immediately vested in their contributions and matching contributions as well as the earnings on these contributions (although an employee to be vested in the 1 percent automatic agency contributions must have completed two to three years of Federal service) (Thrift Investment Board, 1989:18). If an employee leaves Federal Service before retirement eligibility, the vested account balance must be transferred to a "tax-qualified employee benefit plan, an IRA, an individual retirement annuity" (Thrift Investment Board, 1989:18) or any such authorized retirement plan. CSRS participants are continually vested in all amounts in their retirement accounts.

Thrift Savings Fund. The Thrift Savings Fund is an account established in the U.S. Treasury that receives funds through: contributions by TSP participants; investment earnings on these contributions; and forfeitures of "any nonvested agency automatic (1%) contributions" (Thrift Investment Board, 1989:8).

The funds in the Thrift Savings Fund are appropriated for the following:

1. investment into one or several of the investment plans available to each TSP participant;

2. payment of benefits of employees who retire or separate from Federal Service;

3. payment of administrative expenses such as costs of recordkeeping and publications;

4. payment to beneficiaries of TSP participants;

5. loans provided under the provisions of the Thrift Savings Loan Program;

6. purchase of insurance. (U.S. Congress, 1988a:551)

The costs of the investment management fees for the C and F Funds are not paid by the Thrift Savings Fund; rather they are deducted from the earnings of the TSP participants in those plans.

Schedule of Fund Payments and Receipts. Contributions by employees, deducted from their weekly pay and paid into the Thrift Savings Fund, are paid out by the Fund and accepted by Wells Fargo for investment on a weekly basis (Figure 2). The total investment earnings from employee weekly contributions

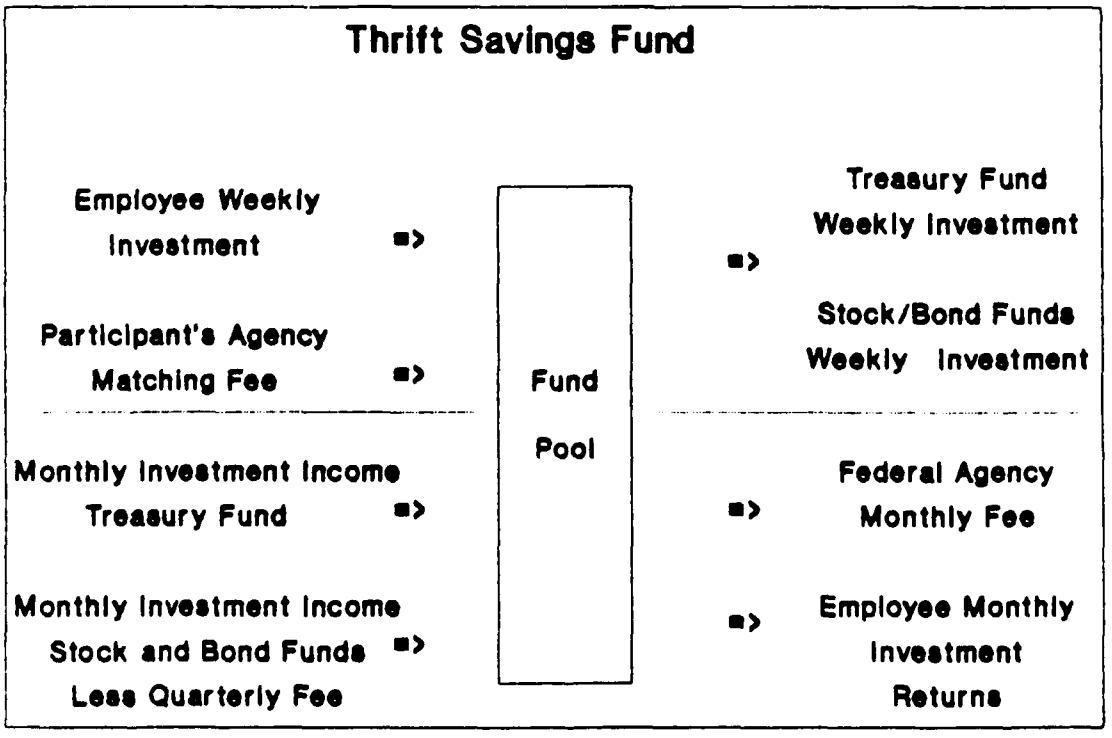

Figure 2. TSP Flow of Funds Schedule

to the TSP are allocated monthly from Wells Fargo to the Thrift Savings Fund. Wells Fargo deducts management fees on a quarterly basis that are computed based on the average quarterly fund earnings multiplied by an unpublished fixed rate (Doone, 1989b). Federal administrative expenses are deducted monthly from the earnings then "the net earnings of each Fund are allocated to participants in proportion to the amount invested in each Fund" (Thrift Investment Board:9). Payments from the Fund to retirees may be made monthly or in the form of a lump sum, depending on the decision of the participant (Thrift Investment Board:18). The payment schedule of other expenses vary. All payments from the Thrift Savings Fund are unaffected by fiscal year budget limitations.

Thrift Savings Investment Plans. Public Law 99-335 established that there would be three types of funds into which the Federal Employees participating in the TSP could choose to invest their contributions. One required fund is the Government Securities Investment Fund, or G Fund, with assets invested solely in special issue U.S. Treasury securities. These nonmarketable, short term securities, by law, must earn a return equal "to the average of market rates of return on U.S. Treasury marketable securities outstanding with four or more years to maturity" (Thrift Investment Board, 1989:12). The rates of such securities are shown in Table 3. Because the assets of the G Fund are invested in U.S. Treasury securities, this fund is considered risk-free with respect to loss on principal or interest.

Table 3

Thrift Savings Plan Annual Returns
(Thrift Investment Board, 1989:12-15)

Year	Wells Fargo Equity Index Fund	S&P 500	Wells Fargo Bond Index Fund	SLHGC Bond Index	U.S. Treasury Market Issues
1984	6.55%	6.12%	15.06%	15.02%	13.13%
1985	32.32%	32.02%	21.32%	21.30%	11.33%
1986	18.49%	18.55%	15.53%	15.62%	8.29%
1987	5.23%	5.23%	2.25%	2.29%	8.73%
1988	16.60%	16.83%	7.58%	7.58%	9.19%

The second fund established by Public Law 99-335 is the Fixed Income Investment Fund, or F Fund, with assets primarily invested in debt securities selected by the asset manager. The current F Fund is invested for the most part in the Wells Fargo Bond Index Fund, a fund that was designed by Wells Fargo "to track the performance of the Shearson Lehman Hutton Government/Corporate (SLHGC) bond index fund" (Doone, 1989a), a bond index developed to measure the performance of the major U.S. bond markets. The Wells Fargo Bond Index Fund contains approximately 550 securities, with various types of Treasury, corporate, and Federal agency notes and bonds included in its portfolio; it also contains investments in the G Fund and other short-term securities for the purposes of purchasing securities and maintaining necessary liquidity levels (Thrift Investment Board, 1989:14). The Bond Index Fund consisted of $900 million in assets as of 1988 (Thrift Investment Board, 1989:14); its return performance is displayed in Table 3.

The third fund established by Public Law 99-335 is the

Common Stock Investment Fund, or C Fund, which is an equity fund "designed to replicate the performance of the index selected" (U.S. Congress, 1988a:553) by the Thrift Savings Board. The current C Fund is invested in the Wells Fargo Equity Index Fund, a fund that was designed by Wells Fargo to track the Standard & Poor's 500 stock index (S&P 500). The Wells Fargo Equity Fund consists of the same common stocks contained in the S&P 500 as well as temporary investments in the G Fund and short term securities for liquidity and stock purchase requirements. As of 1988 the Equity Index Fund held $12.5 billion in assets (Thrift Investment Board, 1989:13); its returns performance is displayed in Table 3.

TSP Asset Management. The Thrift Investment Board manages the assets of the Government Securities Investment Fund, or G Fund. The G Fund is held in trust by the U.S. Treasury (Thrift Investment Board, 1989:12).

Wells Fargo is the current investment firm that manages the TSP's Equity and Bond Index Funds. Wells Fargo selects securities for the Equity Index Fund (C Fund) and for the Bond Index Fund (F Fund) based on how well they perform in comparison with the S&P 500 and SLHGC bond indices respectively; this type of investing is referred to as passive investment management, "which means that the asset manager selects and holds securities that will track closely the performance of the index" (Doone, 1989a). The Thrift Savings Board, although it monitors the performance of both Funds, does not regulate the investment firm's selection of TSP Fund

assets; furthermore, management and client opinions do not affect the selection of Fund assets:

> because the C and F Funds are invested in passively managed commingled index funds, the selection of securities for the two Funds is based on the objective of tracking the respective indexes and is not influenced by the asset manager's opinion of future performance of the securities.
>
> The commingled funds contain assets of many private-sector and public plans, and clients in these funds do not impose investment restrictions on Wells Fargo. Clients who wish to exclude certain securities from the index must place their assets in separate account, which Wells Fargo manages exclusively for those clients. Such an arrangement is more expensive in both custodial fees and trading costs. (Doone, 1989a)

Wells Fargo reports the earnings of the C and F Funds on a monthly basis; however it invests TSP participants' contributions on a weekly basis. Therefore the weekly investment cash flows could affect the monthly rate of returns. To limit the effect on weekly investment cash flows on earnings, Wells Fargo reports Fund performance on a time-weighted basis where "the returns assume a constant dollar balance during each month and throughout the period measured" (Doone, 1989a). As explained by Alison Doone, Thrift Savings Board Deputy Director for Investments,

> The C and F Fund cash flows do affect the C and F Fund returns. The C and F Fund balances in the Wells Fargo Funds have been greater at the end of the month; therefore, the C and F Fund returns have been weighted toward the Wells Fargo returns in the latter half of the month. As the C and F Funds grow larger, this difference should be mitigated by the fact that monthly C and F Fund cash flows are becoming an increasingly smaller percentage of the existing balance. (Doone, 1989a)

Selection of the TSP Asset Manager. The Thrift Investment Board "competitively contracted with Wells Fargo Bank, a subsidiary of Wells Fargo & Co., to manage the C and F Funds" (Thrift Investment Board, 1989:12). The selection of Wells Fargo was based on criteria set forth in the Request for Proposals (RFPs) used to solicit bids for the management of the C and F Fund assets. Bids are solicited every three years, after which time the contract with the asset manager expires.

Regulations Governing Investments

Overview. The purpose of this section is to review current regulations on investments that have potential constraining effects on an MRS fund financed through private sector investments. As noted previously, these regulations affecting the MRS might exist, in particular, to limit risk of loss on investment and Federal conflict-of-interest. The investment policies/regulations of private pension funds and life insurance funds may be similar to those of an MRS funded by private investments; under this assumption, the regulations governing such funds will be reviewed and used to draw conclusions on potential regulations affecting the MRS investments.

Life Insurance Companies. Regulations governing life insurance companies are determined on a state level, that is, state regulations apply to companies that are chartered by that particular state. State regulations generally specify

the following:

1. percentage limits on conventional mortgage holdings relative to total assets;

2. maximum loan-value ratios on mortgages (usually below those allowed for savings and loans associations and mutual savings banks;

3. reserve levels against holdings of lower-quality bonds as well as preferred stocks;

4. rules for valuing certain securities which have not met scheduled interest, dividend, or sinking-fund payments;

5. limitations on common stock and direct real estate ownership; and

6. an allowable percentage of assets (usually around 3 to 4 percent, in a provision often referred to as a basket clause) which can be invested in investments that otherwise are limited or ineligible. (Darst,1981:264)

Although regulations on investment vary from state from state, enough similarities exist to describe in a general way the criteria, relevant to the MRS private sector investment approach, by which life insurance companies may select fund assets. The regulations on life insurance set forth by the states of New York, Ohio and Texas were reviewed to obtain the following such criteria:

1. The life insurance fund may invest in an unlimited amount of mortgages and preferred stock with respect to total assets, however, it may not hold more than approximately 2 to 5 percent of its total assets in any one particular mortgage or corporation in which it is invested.

2. The life insurance fund may own common stock of up to 10 percent at total fund assets; however, it may not hold more than approximately 2 percent of a particular corporation with respect to total fund assets.

3. The life insurance fund may own real estate in amount

of between 10 to 20 percent total fund assets; however investment in individual property may not exceed 2 percent of the total fund assets.

4. The life insurance company may loan or invest approximately 5 percent of total assets in investments which are limited or not permitted under the state regulations (such as investments in options or small businesses, referred to as venture capital).

5. The life insurance company may purchase unlimited interest-bearing obligations that are Federally insured or guaranteed by law to be payable (such as Federally insured certificates of deposit and Treasury bills).

8. The life insurance company may purchase foreign investments under the same conditions as domestic investments of up to one percent of total fund assets, except in the case of Canada, where it can invest up to 10 percent of total fund assets.

9. A life insurance company authorized to do business in a foreign country may invest an amount in that foreign country limited either by the rules of that country or up to one and one-half times the amount of the insurer's legal reserves (funds held in trust by the state to insure fund solvency), whichever is the greater amount.

10. The life insurance company must maintain a minimum capital and surplus that is determined by the state; it may not invest fund assets in itself.

Beneficiaries of life insurance funds generally are guaranteed payment on their policy and assume no risks on investments of their premiums; as a result, the above rules exist to force the life insurance companies to stress "solvency as the primary investment objective, followed by high and predictable rates of return on investment with minimum risk of loss" (Darst, 1981:258).

In summary, life insurance companies are required to conservatively invest their fund assets, due to the nature of their liabilities and the high degree of regulation. If an

MRS that was funded by private sector investments was managed by an investment firm that actively managed the fund (that is to say the fund manager selected fund assets based on preference versus simply tracking an index as in the TSP investment plans), it is possible that the investment firm's selection of MRS fund assets will be subject to Federal regulation; this would be the case particularly if the Government were to assume total risk of loss on investment. The regulations on life insurance fund investments, because they emphasize conservative investment strategies, may serve as reasonable examples of regulations that would govern the MRS fund.

Private Pension Funds. Unlike life insurance funds, there are no regulations that specify types and amounts of eligible investments that managers of pension funds in private industries may choose. However, there are Federal guidelines established under the Employee Retirement Income Security Act (ERISA) in 1974 that were designed to protect participants in pension plans or their beneficiaries from fund mismanagement. Although ERISA does not apply to Government pension plans, some of the provisions it sets forth with regard to the responsibilities and liabilities of pension fund managers may be applicable to the investment manager of an MRS fund financed by the private sector.

According to ERISA, all those who are in any way involved with planning, administering, advising, or holding any classifiable fiduciary responsibilities with regards to a

pension fund must

1. discharge his or her duties solely in the interest of plan participants and beneficiaries and for the exclusive purpose of providing plan benefits to them and defraying the reasonable expenses of administering the plan;

2. act with the care, skill, prudence, and diligence under the circumstances then prevailing that a "prudent man" acting in like capacity and familiar with such matters would use in the conduct of an enterprise of a like character and with like aims;

3. diversify plan investments in order to minimize the risk of large losses unless it is clearly prudent not to do so;

4. operate in accordance with plan documents and instruments. (U.S. Department of Labor, 1988:38)

Further, to preclude conflict-of-interest problems, all those who are in any way involved with planning, administering, advising, or holding any classifiable fiduciary responsibilities with regards to a pension fund must not

1. be paid for his or her services if he or she is already receiving full-time pay from an employer or union whose employees or members are participants;

2. deal with plan assets for his or her own account or in his or her own interest;

3. act in any capacity involving the plan on behalf of a party whose interests are adverse to the interests of the plan, its participants, or its beneficiaries;

4. receive any consideration for his or her personal account from any party dealing with the plan in connection with a transaction involving plan assets;

5. permit the investment to exceed 10 percent of plan assets in certain securities of the employer or of a substantial affiliation of the employer or certain real property leased to the employer (except in the case of profit sharing plans, stock bonus, thrift or savings, employee stock ownership plans, and certain money purchase plans)

> 6. cause a plan to engage in a transaction with a "party in interest" if the transaction involves, directly or indirectly, sale, exchange, or lease of property; lending money or extending credit; furnishing goods, services or facilities; or transfer of assets to or use of assets by or for the benefit of a party in interest. (U.S. Department of Labor, 1988:38)

Those who violate the above provisions may be held responsible for any losses to a pension fund and required to pay back to the fund the amount equal to the losses that they incurred.

In summary, pension fund administrators are required to prudently, not necessarily conservatively, invest their fund assets; they have much more flexibility in selecting fund assets in comparison to managers of life insurance funds and may even select investments considered risky, such as options and venture capital; however, the consequences of ERISA force pension managers to select a mix of assets that overall meet a tolerable level of risk of loss on investment. If an MRS funded by private sector investments was managed by an investment firm that selected fund assets versus tracking an index, the provisions of ERISA may lend insight into the standards that would be set by the Federal Government restricting the activities of the investment firm AND Government officials in the investment management of the MRS fund.

Summary

This section has reviewed the current MRS Fund, the private sector funding approach proposed by Henry, the Federal

Employee Thrift Savings Plan, and the regulations governing investments of life insurance and private pension plans. The private sector funding approach was found by Henry to provide higher rates of return to the MRS fund than the current investment approach; however, with higher returns there was an increased risk of loss on investment. Also, the private sector approach required the Government to issue Treasury bills or raise taxes to provide the cash required for the investment of MRS funds in the private sector. The issues of financing the MRS private sector approach and the associated risk of negative returns were generalized as administrative and regulatory issues. The TSP was described in detail for the purpose of proposing it as an administrative model for the modified MRS. The regulations governing investments of life insurance and private pension fund assets were discussed to present such restrictions as applicable to the MRS in terms of selection of fund assets and limiting risk.

In the following section, the methodology used in this study will be discussed. The administrative and regulatory assumptions that affect the MRS private sector funding approach will be developed from the review in this section.

III. Methodology

Introduction

The problem investigated in this study was how administrative and regulatory factors affect the cost of financing an MRS supplemented by private sector investments. A primary administrative factor considered in the analysis was the schedule of MRS receipts and expenditures; another factor was the use of the TSP as an administrative model for the new MRS whenever possible. The two primary regulatory factors included the plans by which the MRS funds were invested and limits on the percentage amount of the MRS funds available for private sector investing.

The approach to measuring the cost of financing the new MRS was to evaluate past MRS monthly flow of receipts and expenditures for various investment plans when various percentages of the total MRS fund were assumed invested in the private sector. The resulting end of year balance was then compared to the actual or projected end-of-year balance as measured by the DOD Actuary. The difference between the two balances could then be used to assess the benefit (or lack of benefit) of the MRS when assumed funded by private sector investments.

A discussion of the administrative and regulatory assumptions and resulting MRS private sector investment plans

that reflect these assumptions precedes detailed explanation of the end-of-year balance analysis approach.

Assumptions on Administrative Factors

Federal Oversight. The Federal Government would authorize an agency, modeled after the Thrift Savings Investment Board, to manage the MRS funding and investment process. This agency would be responsible for selecting an MRS private sector asset manager and monitoring the MRS fund performance. It would manage the MRS fund assets that were invested in Government securities and would track the intra- and extragovernmental flow of funds that would result from a private sector investment approach (Figure 3). The agency

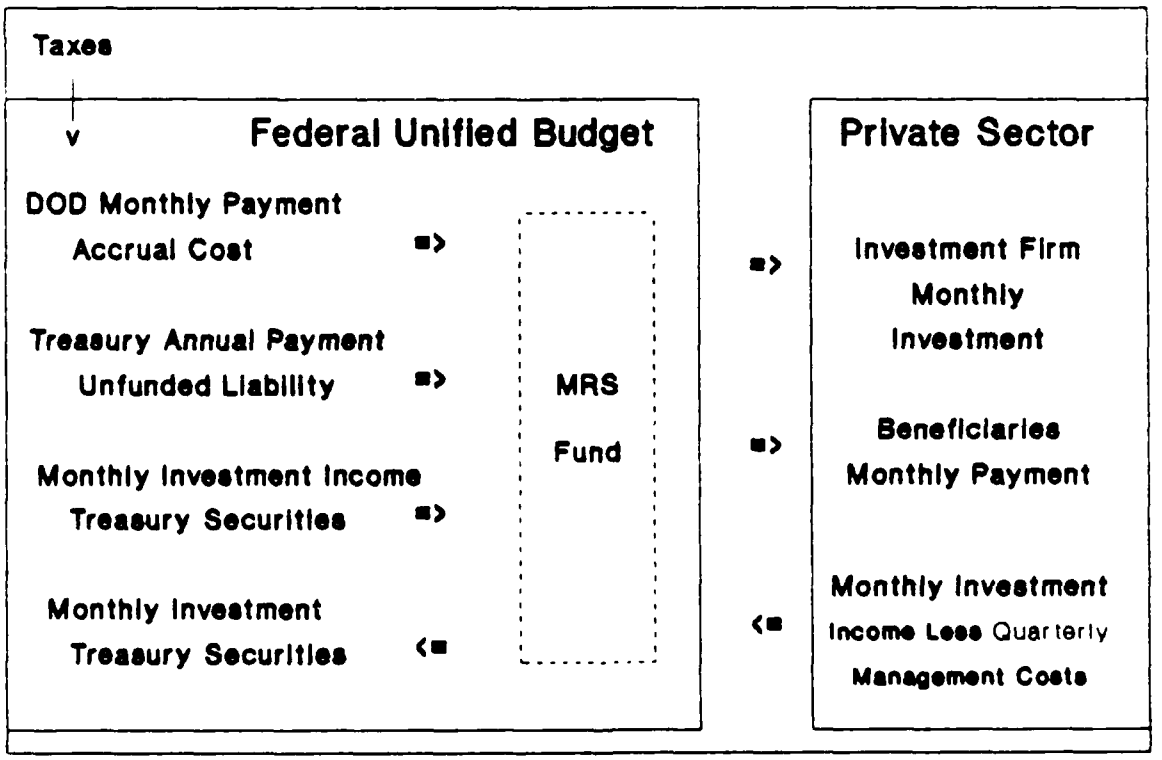

Figure 3. Hypothetical MRS Flow of Funds

would not interfere with the asset manager's selection of fund assets; rather, the asset manager would be obliged to manage MRS fund investments under Government contractual terms.

Schedule of MRS Fund Payments and Receipts. The MRS fund, held by the Treasury, would be analogous to the Thrift Savings Fund in that it would exist as a depository for the monthly DOD contribution, the annual Treasury contribution, and the monthly investment income from Government and private sector investments. The DOD and Treasury contributions plus the monthly earnings on Treasury securities represent MRS fund receipts within the Federal unified budget (intrafund receipts); the earnings on private sector investments reflect fund receipts that come from outside the unified budget (extrafund receipts).

MRS fund expenditures are the monthly payment of benefits, monthly investments in Treasury issues, and monthly transfer of funds to the management firm for investing. The fund expenditures that go toward beneficiaries or toward private sector investments reflect expenditures that leave the unified budget; Treasury investments are expenditures kept within the unified budget.

Source of MRS Private Sector Funding. Unlike the TSP, which relies on employee contributions and agency matching funds, the MRS private sector investment approach was assumed funded through Treasury issues or taxes.

MRS Fund Federal Administrative Fees. As discussed in Section Two, the Thrift Savings Board deducts a Government

management fee from the TSP fund to recover the costs of recordkeeping and publications; because the TSP is a voluntary program, the fees are used to pay for publications that promote and explain the program to Federal employees and for the costs of administering individual accounts. For this analysis, such fees were not deducted from the MRS fund because it was assumed that the MRS would continue as a nonvoluntary, defined benefit program under the private sector approach; as such, the MRS would not incur costs associated with publications or recordkeeping.

MRS Fund Investment Management Fees. For the purpose of this analysis, the fee charged to the Government by the investment firm in payment for the administrative and investment costs of the MRS fund was calculated as:

> (a contractually agreed upon fixed percentage rate) x (average quarterly rate of return on invested MRS funds) x (quarterly investment earnings of the fund);

this formula was selected in an attempt to model the management fee calculation after the TSP. Information on how the TSP management fees were determined when the average quarterly rate of return was negative was not available; this analysis assumed that when the quarterly average rate of return was negative, then the investment firm received no fee for that quarter. The fixed percentage rate used to calculate investment management costs for the TSP was not available; the rate used in this analysis was 0.35 percent. This rate was

used because it represented an approximate 1.5 percent annual fixed percentage rate which may be a reasonable estimate of the TSP fixed percent rate; also the use of this coefficient resulted in annual management costs that ranged between 0.1 to 0.2 percent of annual investment income earned by the fund; this too may be a reasonable estimate.

This analysis used the TSP as an administrative model for the MRS private sector approach; as such, the calculation of investment management fees was based on the method that the Thrift Savings Board uses to calculate investment management fees. However, specific data was not available on TSP management fees to obtain actual figures on such fees; although the methodology to calculate the fees was assumed to duplicate that of the TSP, the management fees calculated in this study were not assumed to duplicate those of the TSP.

Assumptions on Regulatory Factors

Risk of Loss on Investment. As mentioned previously, the Federal Agency that would monitor the firm which manages the MRS private sector investments would not direct the firm on what investments to make. However, this study assumed that the Federal Government would insure the MRS fund against losses on investment; that is to say, if the returns from the private sector fund were not enough during a particular month or months to fulfill the obligations of the MRS fund, then the Government would ensure that funds are made available to pay the required amount. Operating under such an assumption, the

Government presumably could approach risk of loss on investment in the following ways:

1.) require the investment firm that actively manages the MRS fund to invest conservatively; that is, like life insurance companies, the firm would have to stress solvency and predictable rates of return in the formulation of its investment strategy;

2.) require the investment firm to invest broadly in the market so that the short term swings in the overall market or market sectors (such as the auto or information sectors) average out to positive returns over a period of time; in this situation the investment firm would be implementing a passive management approach; it would be required, like the managers of the Thrift Savings C and F Funds, to ensure that the MRS funds are invested in an index plan and track the particular index as closely as possible.

3.) for the two types of plans, the Government could further reduce the risk of loss on investment by specifying a maximum percentage of the total MRS fund allowed for private sector investment.

Conflict Of Interest. For either of the investment approaches discussed above, conflict-of-interest with respect to investment firm and Federal management could be minimized by means of enforcement of rules modeled after ERISA (reviewed in Section II). The potentially large sums of investment income that could be gained through private sector investing may be tempting to those who might wish to divert the income towards other expenses. Also there might be those who try to benefit their positions by influencing the type of investments that the Federal Agency has authorized the investment firm to make. For a conflict-of-interest example, MRS funds could potentially be invested excessively in defense stocks, due to the close nature between the military and the defense

industry. ERISA addresses the maximum amount of investing in companies that are closely affiliated with those who are involved with investing fund assets; this kind of rule, if enforced, would prohibit the excessive investment of MRS funds in defense stocks. ERISA also addresses the illegalities of performing transactions with "parties of interest"; this rule, if enforced, could again limit the investment of MRS funds in defense stocks as well as prohibit Federal officials from dictating how and where MRS funds should be invested.

For this analysis, it was assumed that the abuse or mismanagement of MRS private sector investment approach would be eliminated through the enforcement of rules modeled after ERISA. Therefore, the investment plans that are presented later in this section do not reflect any changes that could result if the investment firm or Government revised the approach for purposes other than the benefit of the MRS.

Foreign Investment. For this analysis, it was assumed that the MRS private sector investment approach was not regulated to exclude foreign investment.

MRS Private Investment Plans

Introduction. There were two general types of private sector investment plans considered in this study. The first type of plan represented commingled funds made up of securities that match selected market indexes; these types of funds track the performance of particular indexes and therefore are passively managed by the investment firm. Since

the firm was assumed to have no control over the performance of an index, the monthly returns were potentially volatile.

The second type of plan was representative of U.S. life insurance funds. This fund was considered actively managed by the investment firm in the sense that the performance of the the fund was not due to the performance of an index but rather by the firm's investment strategy. However, the selection of investments for this type of plan reflected the constraints that would possibly be placed on the firm by the Government to insure a conservative investment approach; these constraints were assumed identical to the restrictions placed on life insurance investments reviewed in Section Two; as such, the monthly returns were assumed to be constant (non-volatile).

Stock Market Index Funds. Stock market indexes represent percentage changes in the average price of groups of securities with respect to a baseline group average price. The returns measured by the indexes may reflect price changes (capital appreciation/depreciation) or price changes plus dividends (distribution of company earnings to stock owners). Also, the stocks that are included in an index may be market value-weighted, that is, the stocks are

> weighted according to the total market values of their outstanding shares. The impact of a component's [stock's] price change is proportional to the issue's overall market value...(Downes and Goodman, 1987:339)

In this study, the stock indexes used were the S&P 500 and the Wilshire 5000 equity indexes. They were both

calculated as market value-weighted and the monthly returns measured by the two indexes reflect price changes plus dividends. The S&P 500 index measures the performance of 400 industrial, 20 transportation, 40 utility and 40 financial stocks with respect to a baseline performance of stocks in years 1941-1943; it represents approximately 80 percent of the market value of stocks listed on the New York Stock Exchange (NYSE) (Downes and Goodman, 1987:478). The Wilshire 5000 index measures the performance of NYSE, American Stock Exchange (AMEX), and over-the-counter (OTC) securities with respect to a baseline performance of stocks in 1980; it represents approximately 86 percent of the stocks listed on the NYSE, 3 percent listed on the AMEX, and 11 percent listed as OTC; between 5000 to 6000 stocks are used to calculate this index (Lewin, 1989).

Corporate Bond Index Fund. Bond market indexes represent average yields on bonds with specified maturities and ratings. The highest bond rating is AAA which means "highly unlikely to default" (Downes and Goodman, 1987:189); the lowest rating is D which means "in default" (Downes and Goodman, 1987:189). The bond index used in this analysis was the Merrill Lynch Corporate Master Index. This index represents approximately 4300 corporate bonds with maturities of one year or more and an average credit rating of BBB or better (Kornstein, 1990). The bonds included in this index are nonconvertable and coupon-bearing, that is they cannot be exchanged for stock and the bond issuers promise to pay the bondholders at interest rates

"expressed as an annual percentage of face value" (Downes and Goodman, 1987:223).

Representative Life Insurance Fund. A U.S life insurance fund typically consists of investments in corporate bonds, mortgage-backed securities, U.S. Treasury securities and to a lesser extent in stocks and real estate. However, there are many life insurance companies operating in the U.S. and they have their own individual investment strategies; for example, John Hancock Mutual Life Insurance Company invests 35 percent in bonds, 33 percent in mortgage-backed securities, and only 3 percent in common and preferred stock; USAA Life Insurance Company, on the other hand, invests 72 percent in bonds and 17 percent in common and preferred stock (A.M.Best Company, 1989:1245,2263). Furthermore, some companies invest only in Treasury securities, while others may invest very little in Treasury securities. In order to avoid having to select any one specific life insurance plan, all of which generally have similar annual returns on investment, the life insurance plan used in this analysis was adopted from the U.S. Census; it is representative of all U.S. life insurance companies. Table 4 lists the assets that U.S. life insurance funds were invested in as of 1987.

Summary of Investment Plans. Under the current MRS, MRS funds are invested in special Treasury issues. To analyze the benefits of the private sector approach, four investment plans were used; they were three index plans and one life insurance plan. The index plans were selected because the TSP uses

Table 4

Life Insurance Fund Assets ($ Billions)
(Bureau of the Census, 1989:508)

	Life Insurance	% Total Assets
Total Assets	1044.5	100.0
Government Securities	151.4	14.5
Corporate Securities *		
Bonds	405.7	38.8
Stocks	96.5	9.2
Mortgages	213.5	20.4
Real Estate	34.2	3.3
Policy Loans	53.6	5.1
Miscellaneous **	89.6	8.6

* includes both foreign and domestic securities

** includes cash, money market deposits, and other investment allowable by law

index funds (and this study attempted to use the TSP as an administrative model for the new MRS when applicable) and because, as discussed earlier, investing in index funds may represent one approach that the Government may take to avoid risk of loss on investment if it were to allow MRS funds to be invested in the private sector. The life insurance plan was selected because it reflects a high degree of regulation; if the Government were to opt for an active management approach to investing MRS funds, the highly regulated life insurance fund that stresses solvency and income could be an appropriate model.

Analysis Methodology

Introduction. Restating the beginning of this section, the problem investigated in this study was how administrative and regulatory factors affect the cost of financing an MRS supplemented by private sector investments. The approach to measuring the cost of financing the new MRS was to evaluate past MRS monthly flow of receipts and expenditures under varying assumptions of administrative and regulatory constraints. The resulting end of year balance was then compared to the actual or projected end-of-year balance as measured by the DOD Actuary. The difference between the two balances were then used to assess the benefit (or lack of benefit) of the MRS when assumed funded by private sector investments.

Hypothetical Flow of Funds Model. A spreadsheet model was developed to measure the hypothetical monthly flow of MRS funds for fiscal years 1985 (when accrual accounting went into effect) to 1989. The MRS fund remained invested in a particular plan continuously between 1985 and 1989; for example, the MRS fund was not invested one year in the S&P 500 Index plan then invested in the Merrill Lynch Bond Index plan the following year. The monthly flow of funds were modeled under the assumptions of intrafund and extrafund receipts and expenditures illustrated in Figure 3. These assumptions were as follows:

1. Intrafund Receipts

a.) the end-of-year MRS fund balance from the previous fiscal year was carried forward into the current fiscal year and calculated as the beginning year balance of the

current fiscal year (the end-of-year balance for fiscal year 1984 was 0 because accrual accounting was implemented in fiscal year 1985. Therefore the beginning year balance for fiscal year 1985 was 0);

b.) beginning each fiscal year, the U.S. Treasury made an intrafund transfer of funds into the MRS fund for the amortization of the unfunded liability;

c.) at the end of each month, the DOD made an intrafund transfer of funds into the MRS fund to pay for the future costs of the MRS (accrual charge or normal cost payment);

d.) at the end of each month, investment income resulting from Treasury issues was transferred into the MRS fund;

2. Extrafund Receipts

a.) at the end of each month, investment income resulting from private sector investments was transferred into the MRS fund;

3. Intrafund Expenditures

a.) at the end of each month, a specific percentage of the MRS fund is transferred to the Treasury and invested in special issue Treasury securities;

4. Extrafund Expenditures

a.) at the end of each month, a specific percentage of the MRS fund is transferred to the investment firm and invested in a private sector plan;

b.) at the end of each fiscal quarter, an investment management fee is deducted from the MRS private sector investment income prior to its transfer to the MRS fund;

c.) at the end of each month, fund disbursements are made to the MRS beneficiaries.

The amortization of the unfunded liability data, the normal cost payment data, and the fund disbursement data used in the model were extracted from the 1989 MRS fund valuation data and are displayed in Table 5. These data represent past data for FY 1985 to FY 1988 and projected data for FY 1989 and beyond. The monthly normal cost payment data were calculated as the

Table 5

Flow of Plan Assets
Used in the Study ($ Billion)
(Office of the Actuary, 1988:16)

	1985	1986	1987	1988	1989
Normal Cost Payments	17.00	17.40	18.30	18.40	18.80
Amortization Of Unfunded Liability	9.50	10.50	10.50	10.30	9.80
Investment Income	1.10	2.50	3.60	4.90	4.30
Fund Disbursements	15.80	17.60	18.10	19.00	20.20
Fund Balance End of Year	11.80	24.60	38.90	53.40	66.10

annual normal cost payment data divided by 12. Similarly, the monthly fund disbursement data were calculated as the annual fund disbursement data divided by 12.

Included in the model of the monthly flow of MRS funds was a regulatory assumption that a selected percentage of the total MRS fund could be invested in the private sector plans between fiscal years 1985 to 1989. These percentages were chosen to be 0 percent, 25 percent, 50 percent, 75 percent and 100 percent. The 0 percent choice represented the current MRS investment approach or 100 percent of the MRS fund invested in Treasury securities; this choice served as the baseline MRS private sector plan by which the hypothetical investment plans were compared and evaluated. The 25 percent choice represented 25 percent of the MRS fund invested in the private

sector, while 75 percent was invested in Treasury issues. The 50 percent choice represented 50 percent of the MRS fund invested in the private sector while 50 percent was invested in Treasury issues. The 75 percent choice represented 75 percent of the MRS fund invested in the private sector, while 25 percent was invested in Treasury issues. And finally, the 100 percent choice represented 100 percent of the MRS fund invested in the private sector, while 0 percent was invested in Treasury issues.

The monthly return rates that were used in the flow of funds spreadsheet model to obtain the index plans' monthly investment income represented actual monthly return data. Monthly return rates used to calculate the life insurance plan's monthly investment income were estimated using published annual return data. Monthly return rates used to calculate investment income from Treasury issues were derived from the flow of funds model; this was done by using various monthly returns when the MRS fund was assumed fully invested in Treasury securities and selecting those returns that resulted in identical end-of-year balances as published in the 1989 valuation of the MRS. The monthly return data may be viewed in Appendix A.

Example Application of the Flow of Funds Spreadsheet Model.

Example Plan. As an example of how the flow of funds model worked, the 0 percent investment approach, or 100 percent of the MRS funds invested in Treasury securities, was

used; the MRS end-of-year fund balance for fiscal year 1985 was calculated.

Spreadsheet Calculations. Referring to Table 6, calculations began with October 1984, the beginning of fiscal year 1985, and continued through October 1985 (Table 7). As explained earlier, the current fund balance was zero because the accrual accounting method began with fiscal year 1985; the current fund balance in the model, referred to as (A), was assigned the value zero. The values for the annual treasury payment (B), the DOD monthly cost payment (C) and the monthly fund disbursements (J) were extracted from the 1989 fund valuation. The monthly interest rates (E) and (G), for the Treasury and private investment plans respectively, were inputs into the program as applicable. These rates and the quarterly fixed rate of .35% for the management fees were used in program calculations to derive the remaining items in the model.

Data Extracted from Model. For each investment plan, more than just the end-of-year balance data was used to evaluate the private sector investment approach (Table 7). The monthly gains and losses data provided information on the volatility of each plan. The total amount of investment income was derived as well estimated investment management costs. Also the annual returns for each plan were estimated. Row (N) in the example flow of funds model shows that there were slowly increasing monthly gains; this suggests that the Treasury investment plan was not volatile and therefore the

Table 6

Example Flow Of Funds Model For 100%
MRS Invested In Treasury Securities
($ Billion)

Spreadsheet Calculations ($ Billions)		as of: FY85 Oct
(A)	Current MRS Fund Balance	0.000
	Intrafund Receipts	
(B)	Annual Treasury Payment For Unfunded Liability	9.500
(C)	Monthly DOD Cost Payment	1.417
(D)	Monthly Investment Income From Treasury Issues	0.000
	(E) Monthly Rate of Return	0.010
	Extrafund Receipts	
(F)	Monthly Income From Private Sector Investments	0.000
	(G) Monthly Rate of Return	0.000
(H)	Total MRS Fund Receipts = [B+C+D+F]	10.917
	Intrafund Expenditures	
(I)	Dollar Amount Of MRS Invested In Treasury = [A]	0.000
	Extrafund Expenditures	
(J)	Monthly Payments To Beneficiaries	1.317
(K)	Quarterly Investment Management Fee	0.000
(L)	Dollar Amount Of MRS Invested In Private Sector	0.000
(M)	Total MRS Fund Expenditures = [I+J+K+L]	1.317
(N)	Total Monthly MRS Fund Gain/Loss = [H-M]	9.600

Table 7

Continuation of Example Flow Of Funds Model
For 100% MRS Invested In Treasury Securities
($ Billion)

	Nov 1	Dec 1	Jan 1	Feb 1	Mar 1	Apr 1	May 1
(A)	9.600	9.796	9.994	10.193	10.395	10.599	10.805
(B)	0.000	0.000	0.000	0.000	0.000	0.000	0.000
(C)	1.417	1.417	1.417	1.417	1.417	1.417	1.417
(D)	0.096	0.098	0.100	0.102	0.104	0.106	0.108
(E)	0.010	0.010	0.010	0.010	0.010	0.010	0.010
(F)	0.000	0.000	0.000	0.000	0.000	0.000	0.000
(G)	0.009	0.009	0.009	0.009	0.009	0.009	0.009
(H)	1.513	1.515	1.517	1.519	1.521	1.523	1.525
(I)	9.600	9.796	9.993	10.194	10.396	10.599	10.805
(J)	1.317	1.317	1.317	1.317	1.317	1.317	1.317
(K)	0.000	0.000	0.000	0.000	0.000	0.000	0.000
(L)	0.000	0.000	0.000	0.000	0.000	0.000	0.000
(M)	1.317	1.317	1.317	1.317	1.317	1.317	1.317
(N)	0.196	0.198	0.200	0.202	0.204	0.206	0.208

	Jun 1	Jul 1	Aug 1	Sep 1	FY86 Oct 1		
(A)	11.013	11.224	11.436	11.650	11.867	<=	end-of-year
(B)	0.000	0.000	0.000	0.000			fund balance
(C)	1.417	1.417	1.417	1.417			
(D)	0.111	0.112	0.114	0.116			
(E)	0.010	0.010	0.010	0.010			
(F)	0.000	0.000	0.000	0.000			
(G)	0.009	0.009	0.009	0.009			
(H)	1.527	1.529	1.531	1.533			
(I)	11.013	11.224	11.436	11.650			
(J)	1.317	1.317	1.317	1.317			
(K)	0.000	0.000	0.000	0.000			
(L)	0.000	0.000	0.000	0.000			
(M)	1.317	1.317	1.317	1.317			
(N)	0.210	0.212	0.214	0.216			

risk of loss on investment in this plan was very small. As suggested by row (K), there were no quarterly investment management fees because none of the MRS funds were assumed invested in the private sector. Investment income was calculated as $1.2 billion by summing up the numbers in rows (D) and (F). Calculating investment income as a percentage of net fund gains (receipts minus expenditures), the fiscal annual rate of return for the example plan was 10.93 percent.

The results of this study for all the investment plans will be presented in the following section. These results were derived in the same manner as the preceding example.

IV. Discussion of Results

Overview

The data resulting from the analysis on the four MRS investment plans discussed in the previous section are presented. These data estimate the financial effects on the MRS fund if the approach to private sector funding discussed in Section Three had been implemented with the beginning of accrual accounting. The results are presented in terms of end-of-year balances, investment income, investment management costs, monthly gains and losses, and fiscal annual rates of return; they are calculated and displayed for the various percentages of MRS funds assumed invested in the private sector.

End of Year MRS Fund Balances

Introduction. The end-of-year balance data for each of the three index plans and the life insurance plan are presented in Figures 4 - 7. Each bar chart figure compares the resulting end-of-year fund balances for fiscal years 1985 through 1989 for an investment plan when 0 percent, 25 percent, 50 percent, 75 percent and 100 percent of the total MRS fund is assumed invested in that plan. As discussed in Section Three, the 0 percent option represents the current MRS funding approach of investing 100 percent in U.S. Treasury

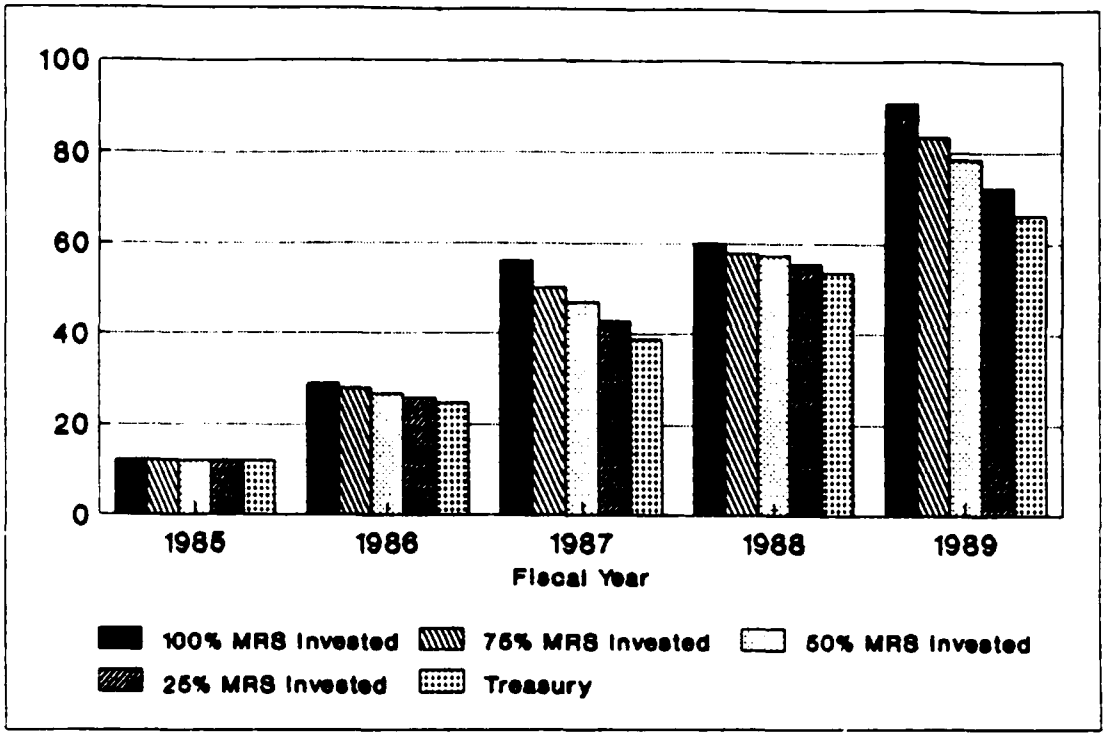

Figure 4. End of Year Balance ($ Billion)
S&P 500 Index Plan

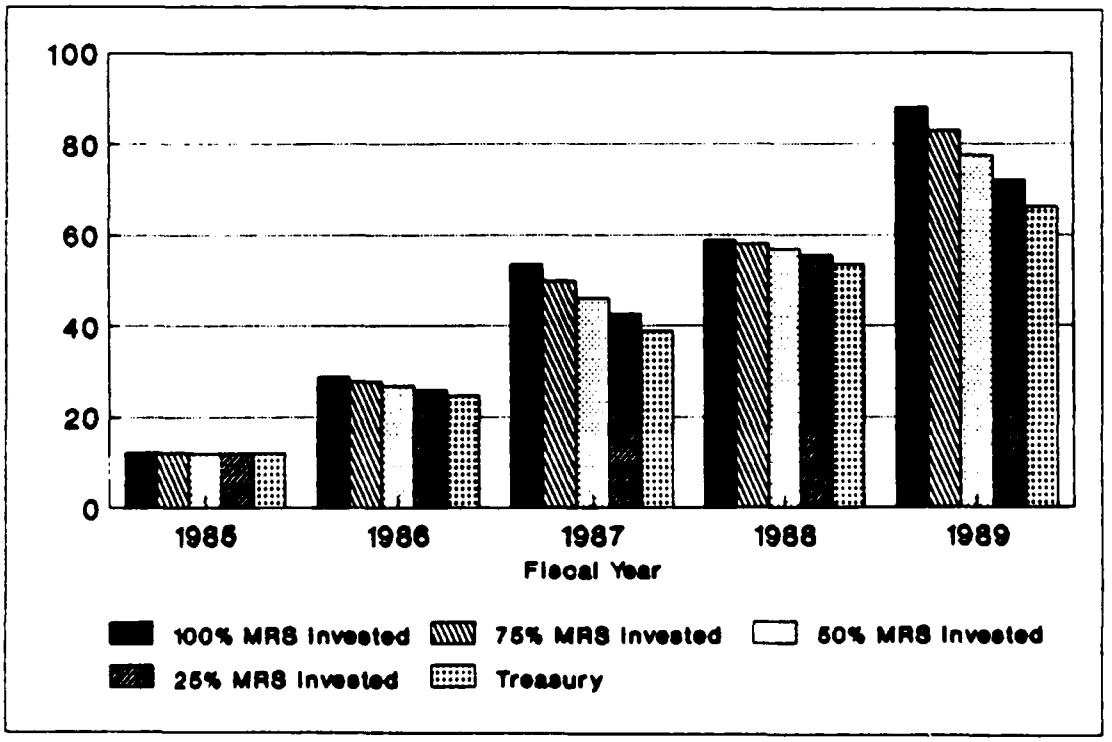

Figure 5. End of Year Balance ($ Billion)
Wilshire 5000 Index Plan

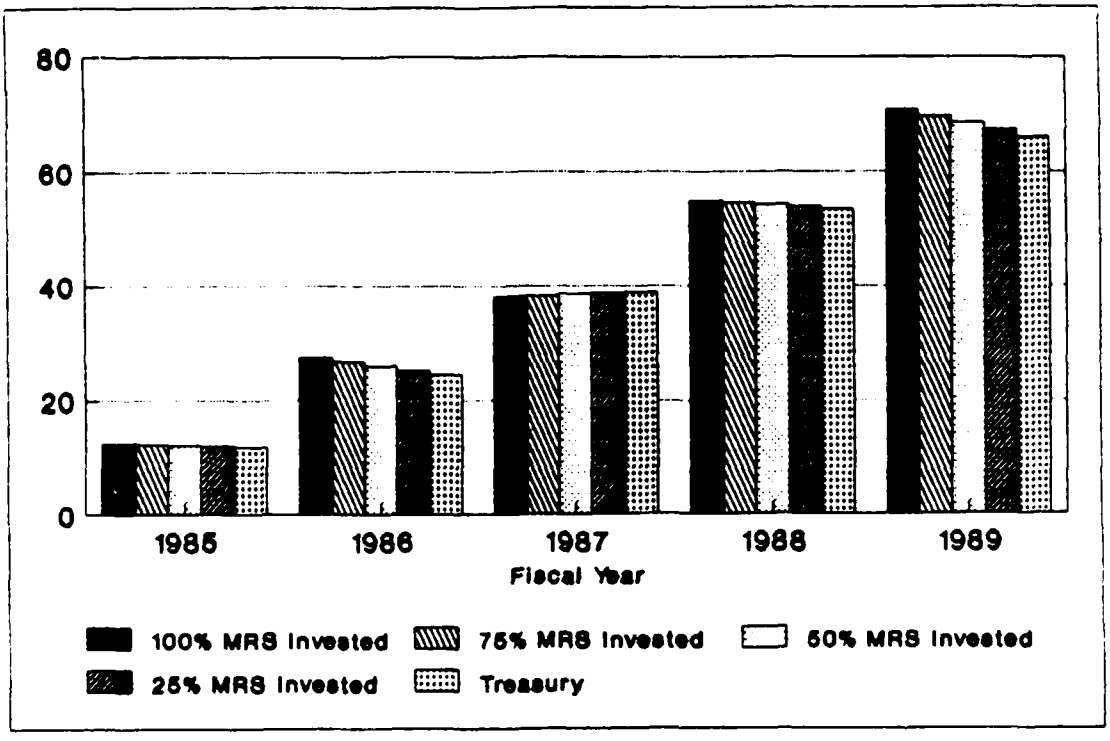

Figure 6. End of Year Balance ($ Billion)
Merrill Lynch Corporate Index Plan

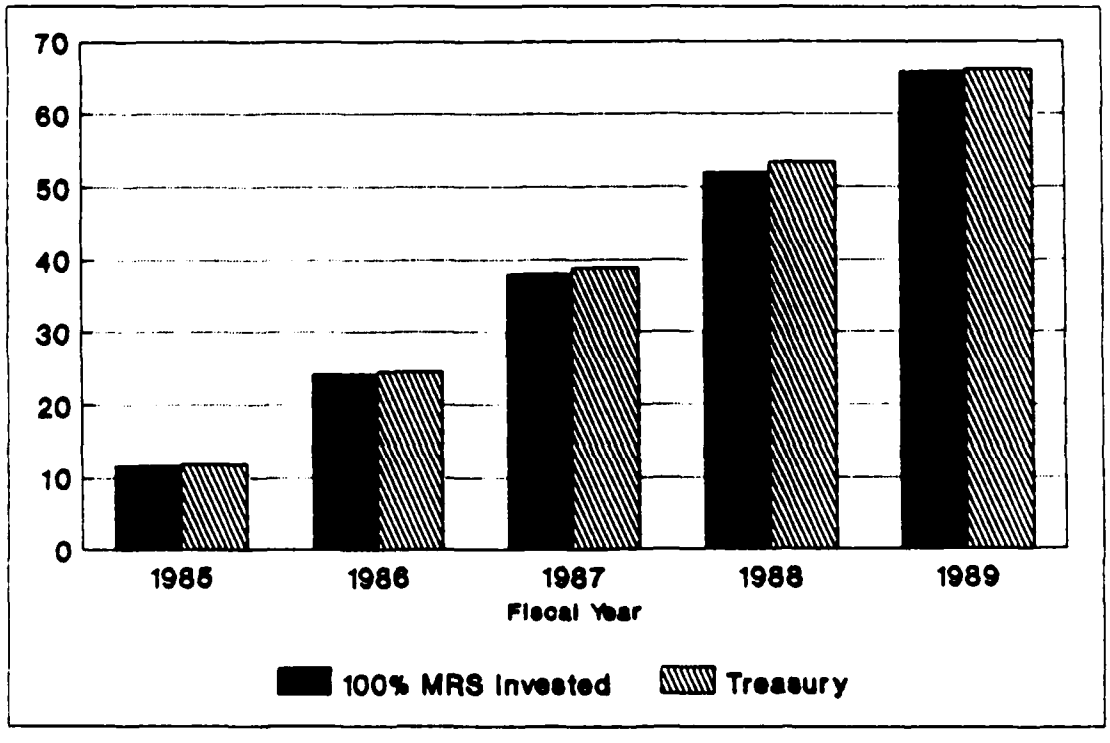

Figure 7. End of Year Balance ($ Billion)
Life Insurance Plan

issues; therefore the end-of-year balances for the hypothetical MRS investment plans may be compared directly with the actual MRS end-of-year balances as published in the fund's 1989 valuation. The numbers that are represented by Figures 4 - 7 may be found in Appendix B.

Results. Under the S&P 500 Index and Wilshire 5000 Index plans over the five year period, an increasingly higher end-of-year fund balance was achieved compared to the current MRS funding approach; even when only 25 percent of the MRS was assumed invested in the stock index plans, the end-of-year balances were higher. The Merrill Lynch Corporate Index plan, in contrast, provided approximately the same end-of-year balances as that of the current MRS funding approach. Similarly, the life insurance plan resulted in no appreciable difference in end-of-year fund balances if the MRS fund had been invested in this plan.

Conclusions. The life insurance and the corporate bond funds provided about the same benefits to the MRS fund as the current funding approach for any percentage of the MRS funds invested in the private sector under these plans. On the other hand, the MRS fund benefited when as little as 25 percent of the MRS fund was invested in either stock index fund.

Investment Income

Introduction. The investment income resulting from each of the three index plans and the life insurance plan are

presented in Figures 8 - 11. Each bar chart figure compares the annual investment income for fiscal years 1985 through 1989 for an investment plan when 0 percent, 25 percent, 50 percent, 75 percent and 100 percent of the total MRS fund is assumed invested in that plan. The 0 percent option represents the current MRS funding approach of investing 100 percent in U.S. Treasury issues; therefore the end-of-year investment income for the hypothetical MRS investment plans may be compared directly with the actual MRS end-of-year balances. The numbers that are represented by Figures 8 - 11 may be found in Appendix B.

Results. Under the S&P 500 Index and Wilshire 5000 Index plans over the five year period, high levels of investment income were earned compared to the current MRS funding approach; however, evaluated on a yearly basis, there were no gains in earnings in 1985 and negative earnings in 1988. Similarly, the Merrill Lynch Corporate Index plan provided higher levels of investment income in comparison to the current funding plan, except in 1987. The life insurance plan resulted in slightly less investment income, except in 1989.

Conclusions. If various levels of MRS funds were invested in the life insurance plan, like the Treasury investment approach, the investment income would consistently increase; this would have been assured by the emphasis that the life insurance plan places on stability and predictable income. In contrast, the MRS fund would have large cumulative gains in investment income yet experience losses on investment

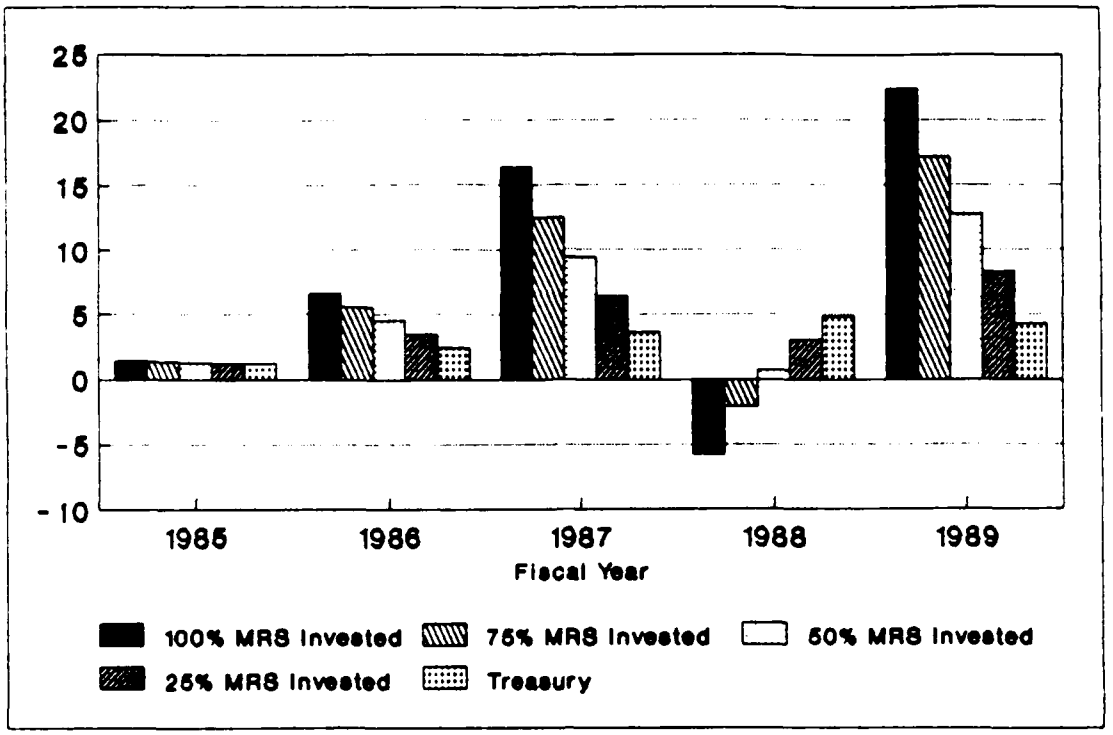

Figure 8. Investment Income ($ Billion)
S&P 500 Index Plan

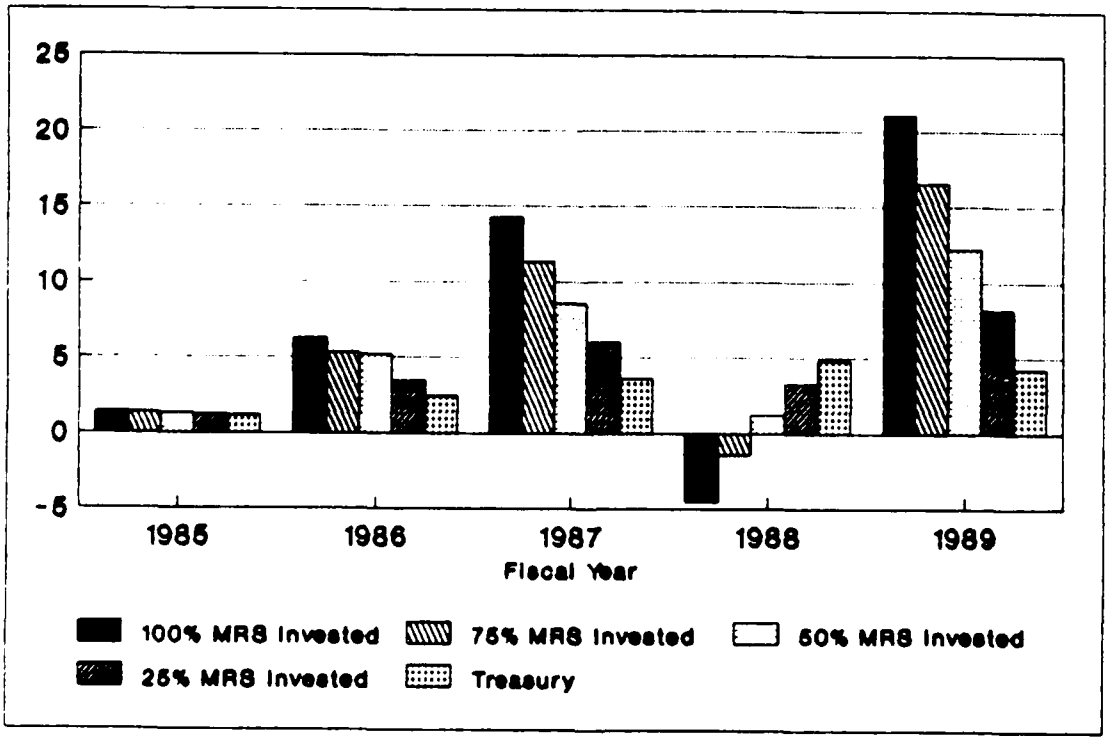

Figure 9. Investment Income ($ Billion)
Wilshire 5000 Index Plan

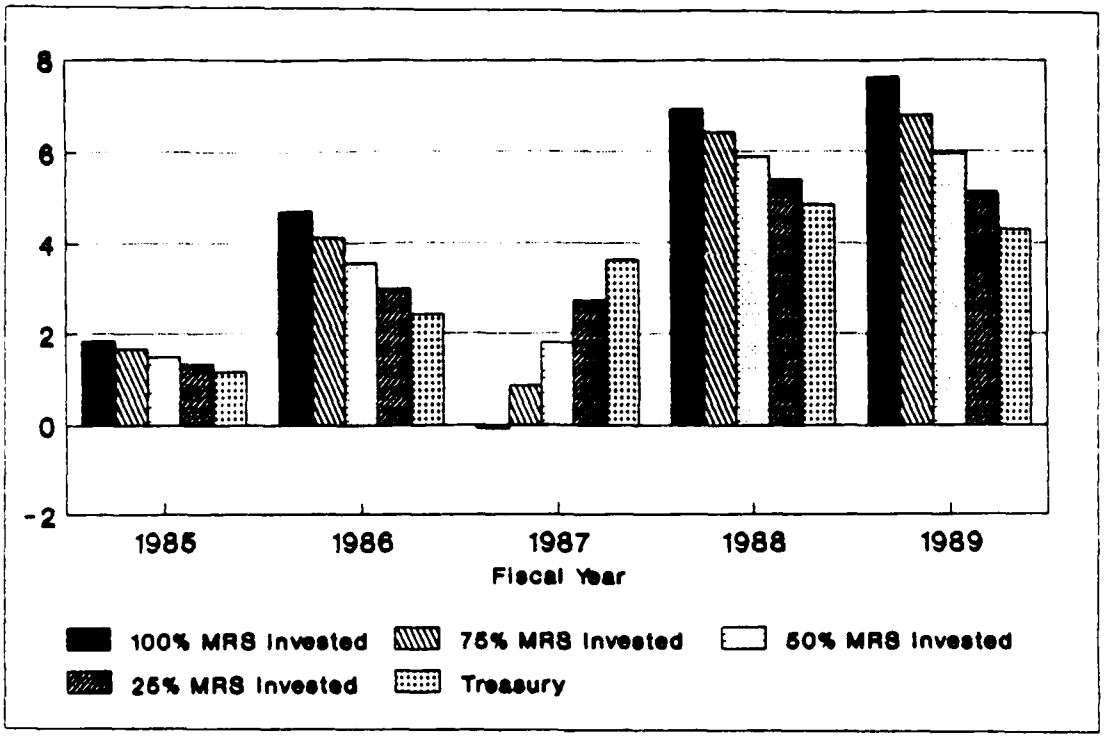

Figure 10. Investment Income ($ Billion)
Merrill Lynch Bond Index Plan

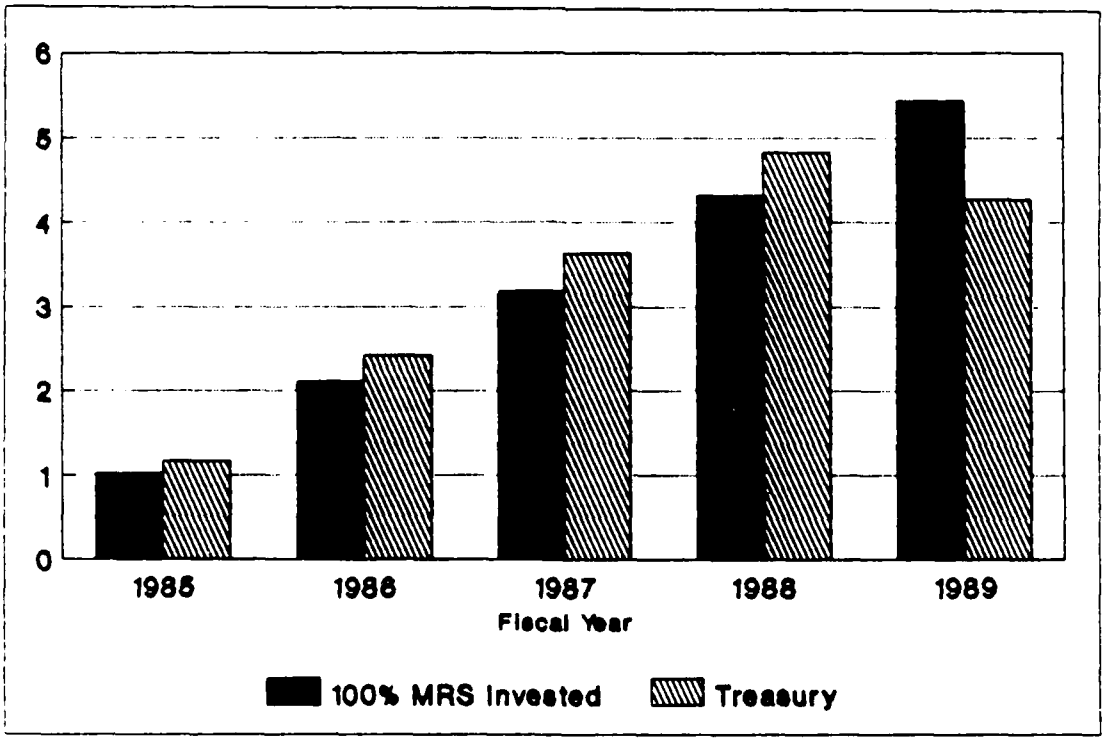

Figure 11. Investment Income ($ Billion)
Life Insurance Plan

income during some periods. Comparing the investment income charts for the three index plans with their corresponding end-of-year fund balances charts, it may be noted that despite the negative earnings, the end-of-year balances over the five year period were either the same or higher than those of the current MRS funding approach; this result suggests that the cumulative high returns from the stock and bond index plans potentially average out the effects of short term losses.

Investment Management Costs

Introduction. The investment management costs for each of the three index plans and the life insurance plan are presented in Figures 12 - 15. Each bar chart figure compares the hypothetical annual investment management costs for fiscal years 1985 through 1989 for an investment plan when 25 percent, 50 percent, 75 percent and 100 percent of the total MRS fund is assumed invested in that plan; the 0 percent option is not included because it represents the current MRS funding approach which does not have associated management costs. The numbers represented by Figures 12 - 15 may be found in Appendix B.

Results. As discussed in Section Three, the formula used to calculate management costs was:

> .35 percent x (average quarterly rate of return on invested MRS funds) x (quarterly investment earnings of the fund).

As such, the management costs are tied to the investment

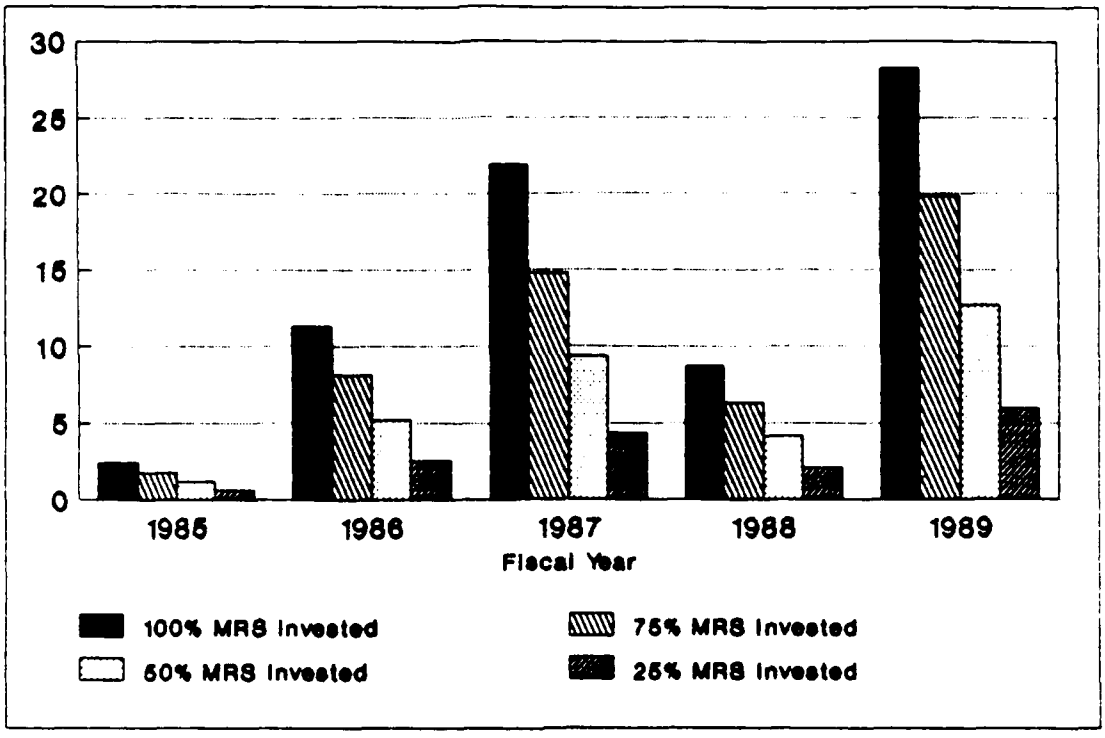

Figure 12. Investment Management Cost ($ Million)
S&P 500 Index Plan

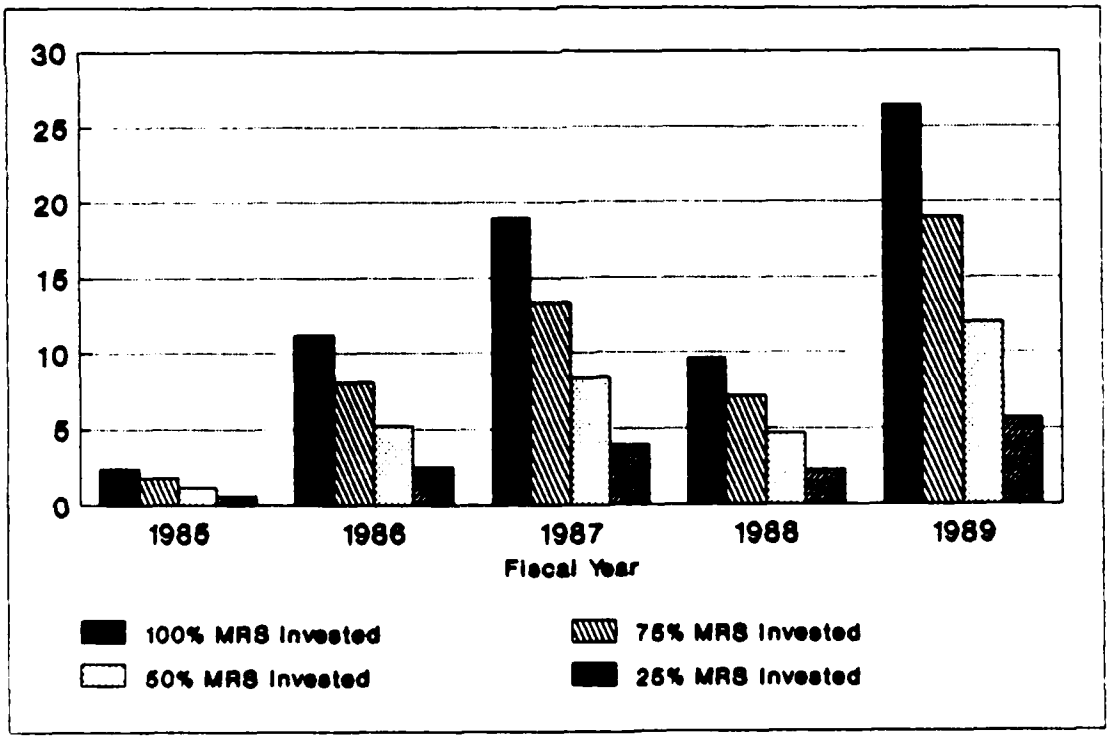

Figure 13. Investment Management Cost ($ Million)
Wilshire 5000 Index Plan

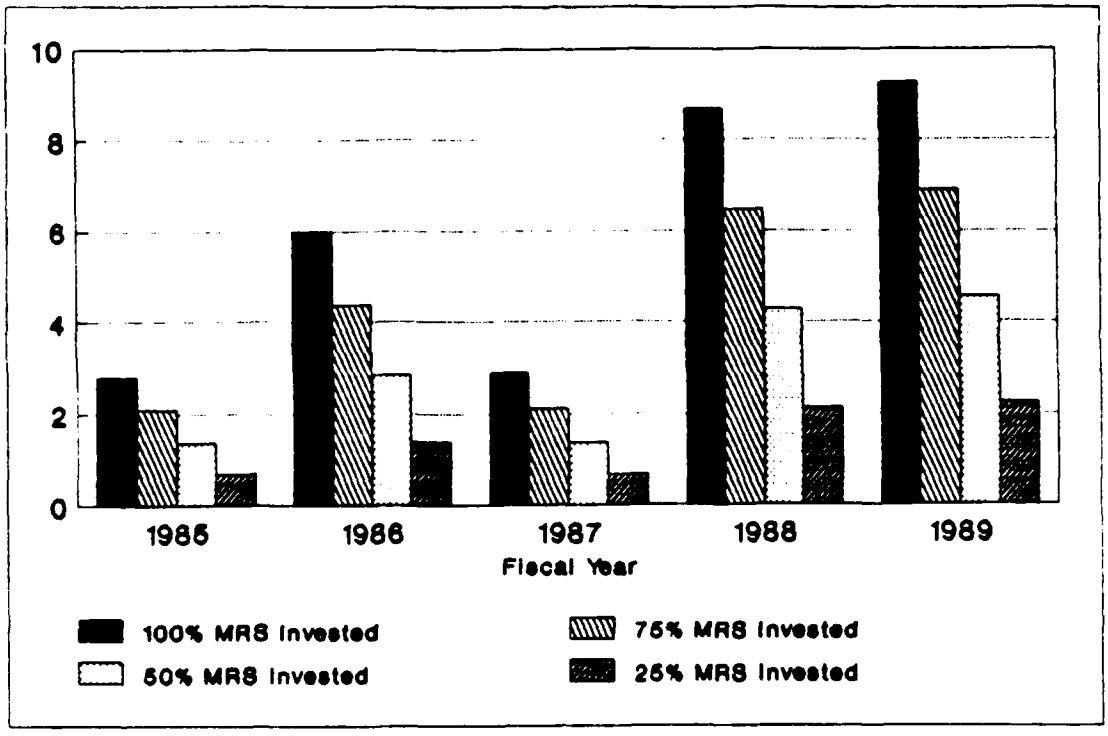

Figure 14. Investment Management Cost ($ Million)
Merrill Lynch Corporate Index Plan

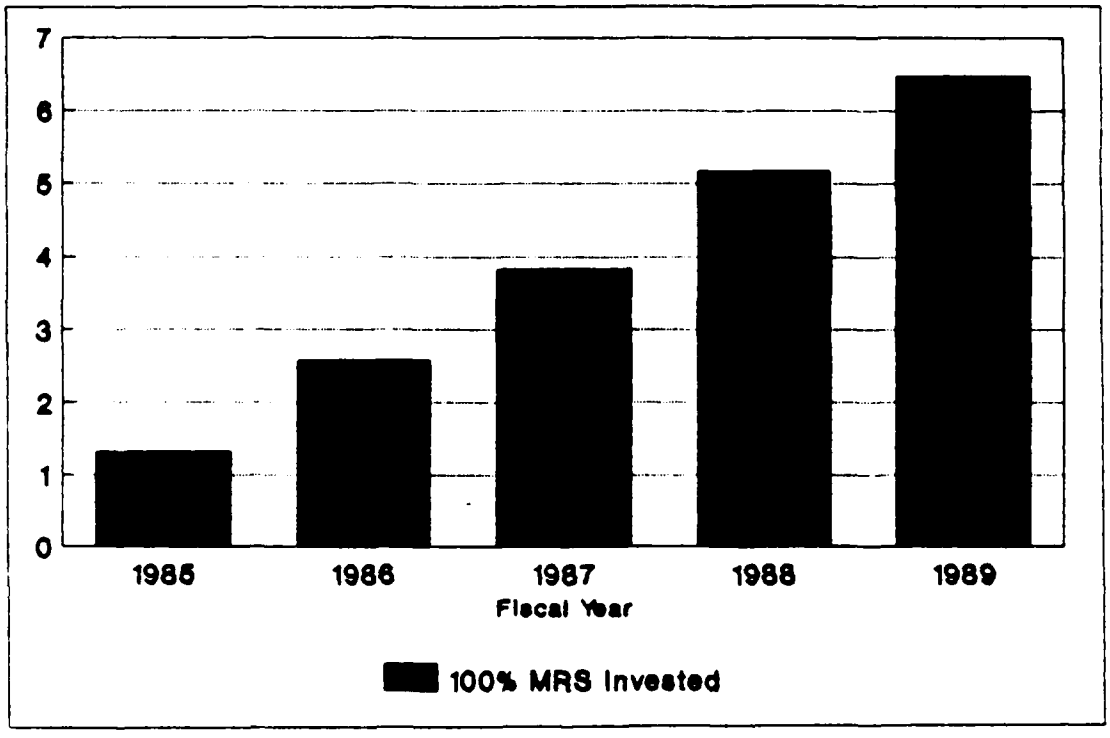

Figure 15. Investment Management Cost ($ Million)
Life Insurance Plan

return rates. When the rates are high, the fund investment earnings are high and the investment management firm receives a correspondingly high quarterly fee. When the rates are low, the firm receives little or no quarterly fee. Therefore the annual management fees are affected by the volatility of each plan.

The hypothetical management fees for the stock index plans fluctuated from around 2 million dollars in 1985 to as much as 26 million dollars in 1989, due to the fluctuations in the stock market. The management costs resulting from the bond index fund fluctuated less and varied between 2.5 and 9 million dollars. The life insurance fund resulted in consistently higher management costs every year.

Conclusions. The annual management costs for the life insurance plan were predictably higher as increasing levels of MRS funds were invested in the plan. The annual management costs for the index plans were extremely inconsistent and probably, for particular years, overestimated what the actual fees would have been. These results may have been due to the use of the .35 percent used in the management cost formula and to the confidentiality of how the TSP addresses the issues of investment management fees.

If the MRS were invested in the private sector plans during the five years, there probably would have been some modifications in the calculations of management fees; a cap on management fees perhaps would have been appropriate or some formula other than the formula used in this analysis would

have been used. There are various ways to calculate investment management fees and this type of information tends to be confidential between institutional clients and investment firms. As such, the results using the TSP formula, although open to speculation, were retained and assumed acceptable in this study.

MRS Fund Monthly Gains and Losses

Introduction. The monthly gains and losses calculated for each of the three index plans are presented in Figures 16 - 27. Each bar chart figure of the index plans shows the monthly fund gains and losses for fiscal years 1985 through 1989 for an investment plan when either 25 percent, 50 percent, 75 percent or 100 percent of the total MRS fund is assumed invested in that plan. The large spikes in the charts represent the annual payment by the Treasury for the unfunded liability; the smaller spikes represent the monthly net gains or net losses (calculated as monthly total fund receipts minus monthly total fund expenditures). Figures 28 and 29 show the monthly gains when the MRS fund is assumed fully invested in the life insurance fund and in Treasury issues, respectively. The numbers that are represented by Figures 16 - 29 may be found in Appendix B.

Results. The S&P 500 Index and Wilshire 5000 Index plans resulted in inconsistent gains over the five year period, particularly when the MRS was fully invested in these plans. The Merrill Lynch Corporate Index plan similarly resulted in some monthly net losses, however not to the extent of the

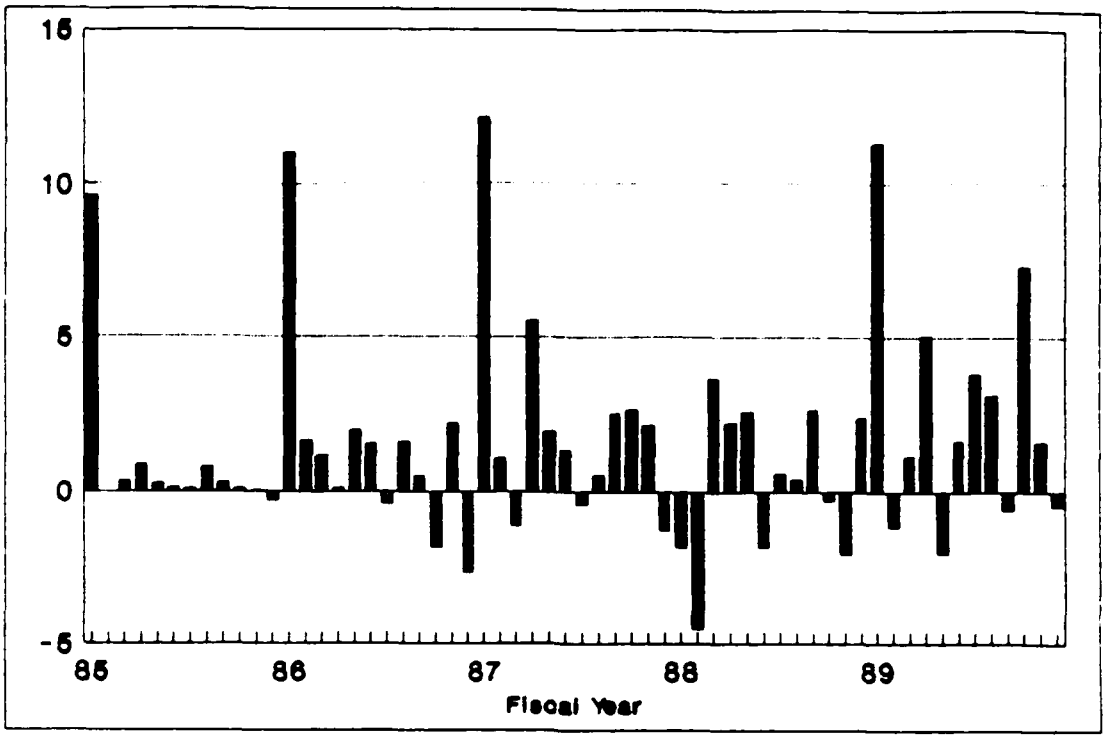

Figure 16. Monthly Gains and Losses ($ Billion)
S&P 500 Index - 100% MRS Fund Invested

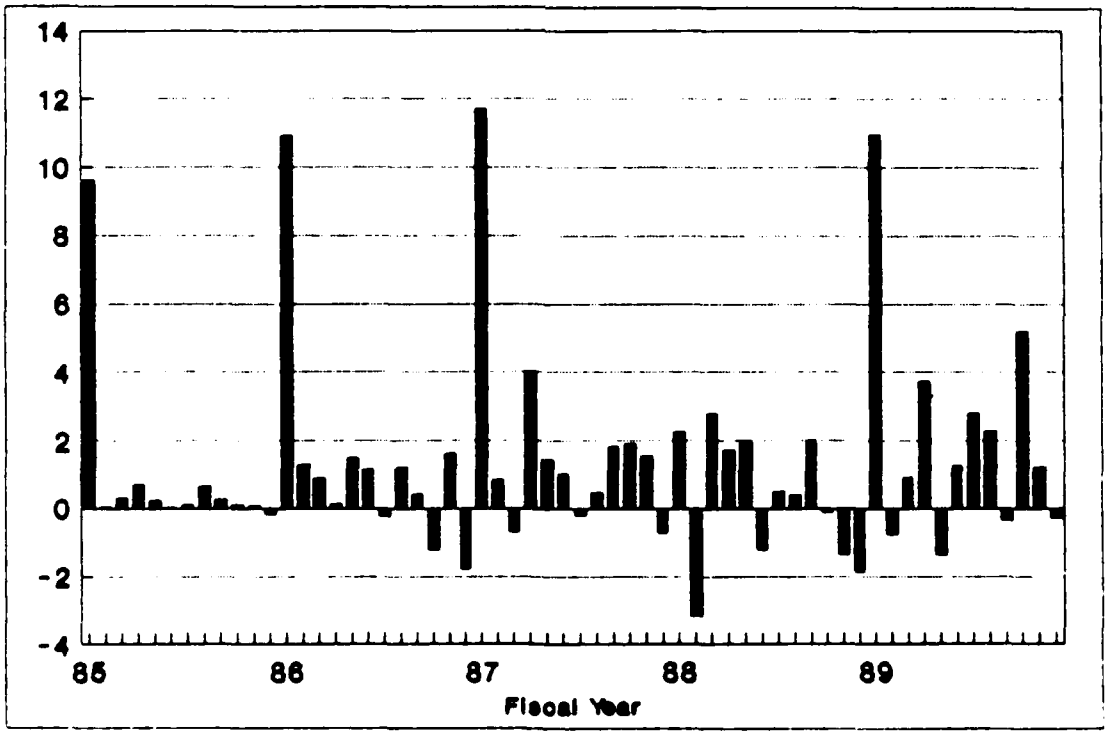

Figure 17. Monthly Gains and Losses ($ Billion)
S&P 500 Index - 75% MRS Fund Invested

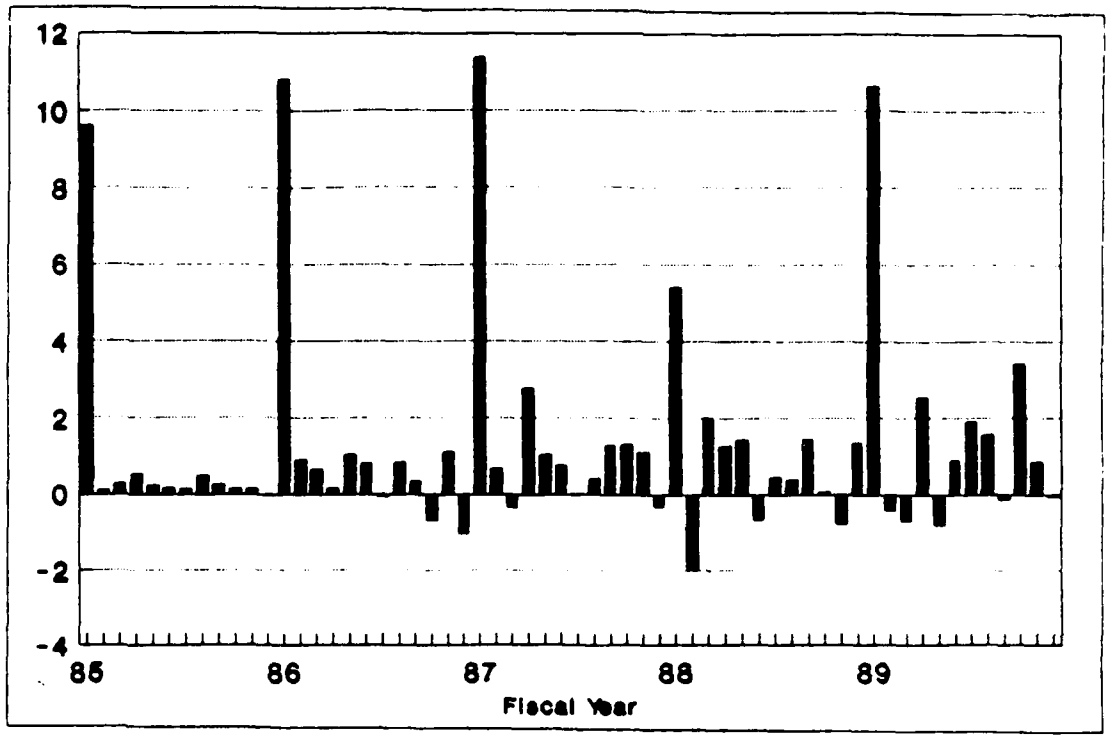

Figure 18. Monthly Gains and Losses ($ Billion)
S&P 500 Index - 50% MRS Fund Invested

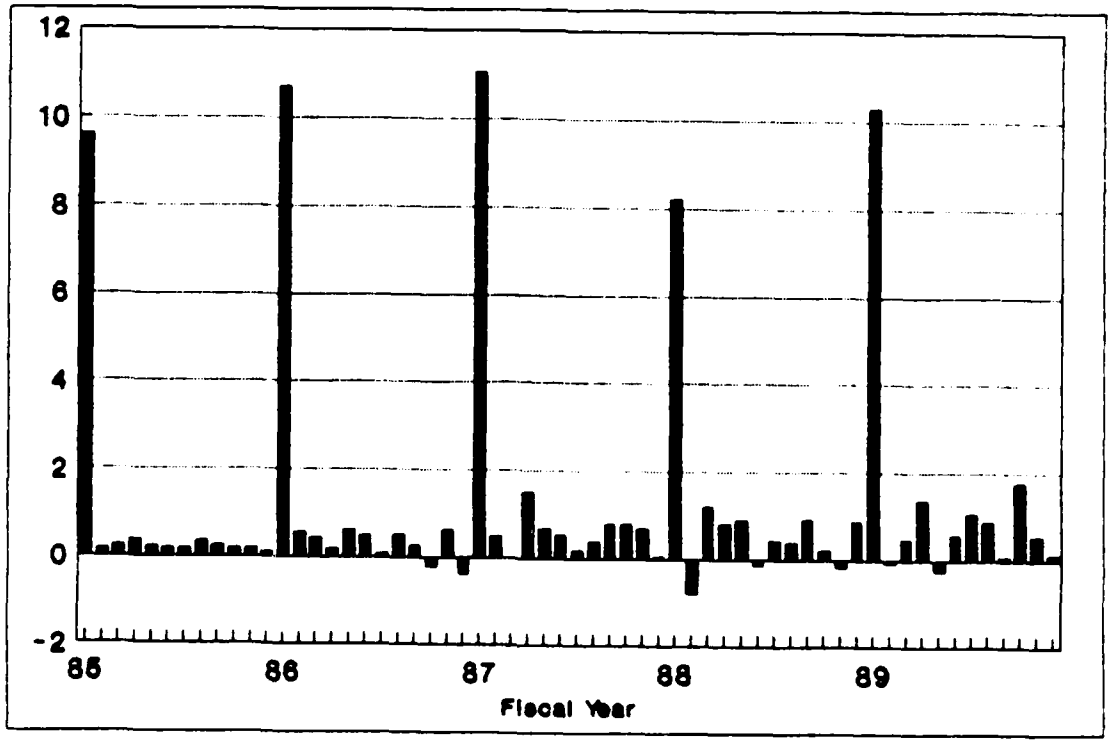

Figure 19. Monthly Gains and Losses ($ Billion)
S&P 500 Index - 25% MRS Fund Invested

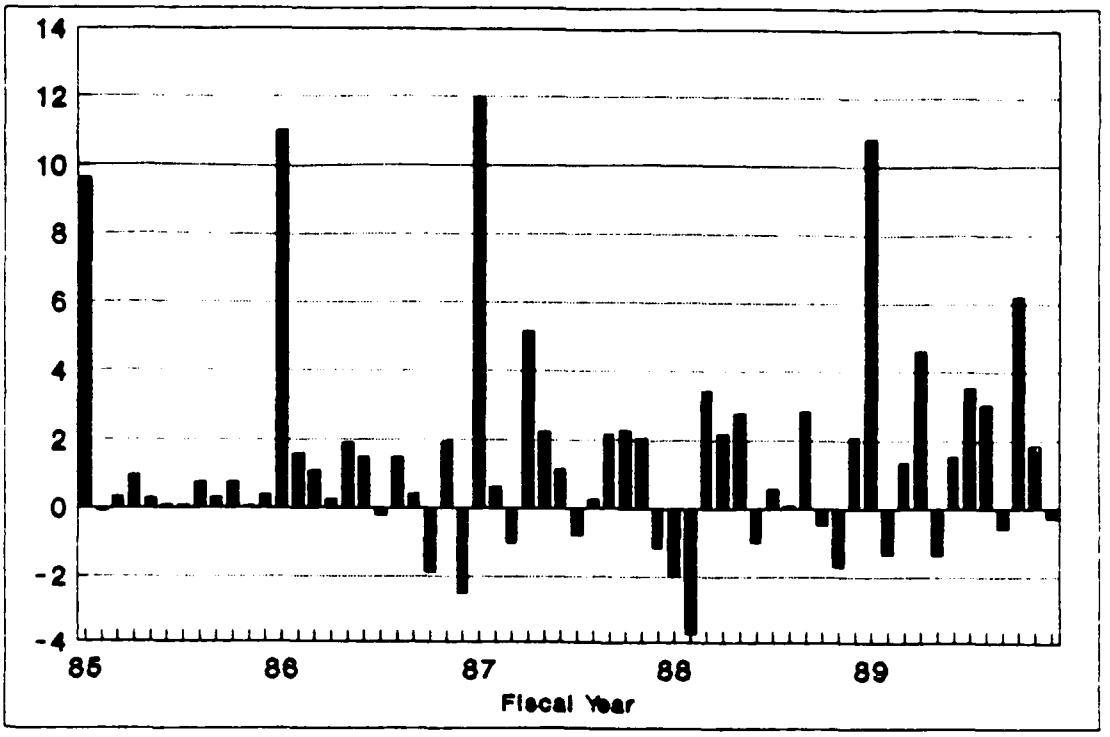

Figure 20. Monthly Gains and Losses ($ Billion)
Wilshire Index - 100% MRS Fund Invested

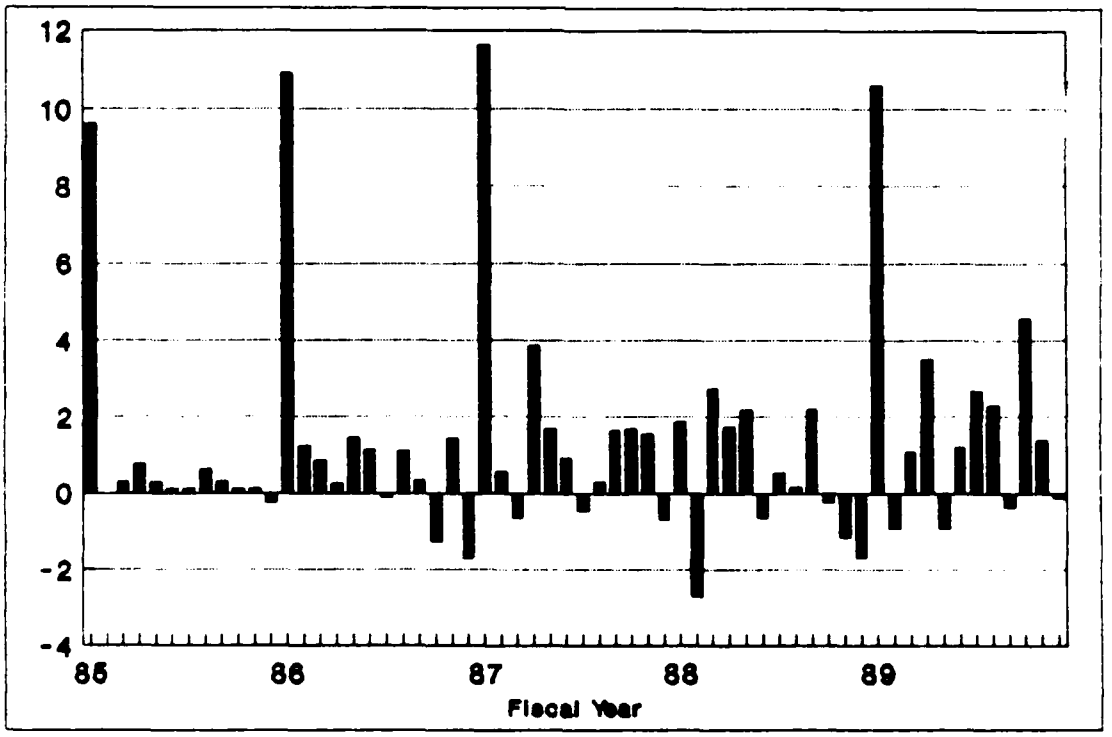

Figure 21. Monthly Gains and Losses ($ Billion)
Wilshire Index - 75% MRS Fund Invested

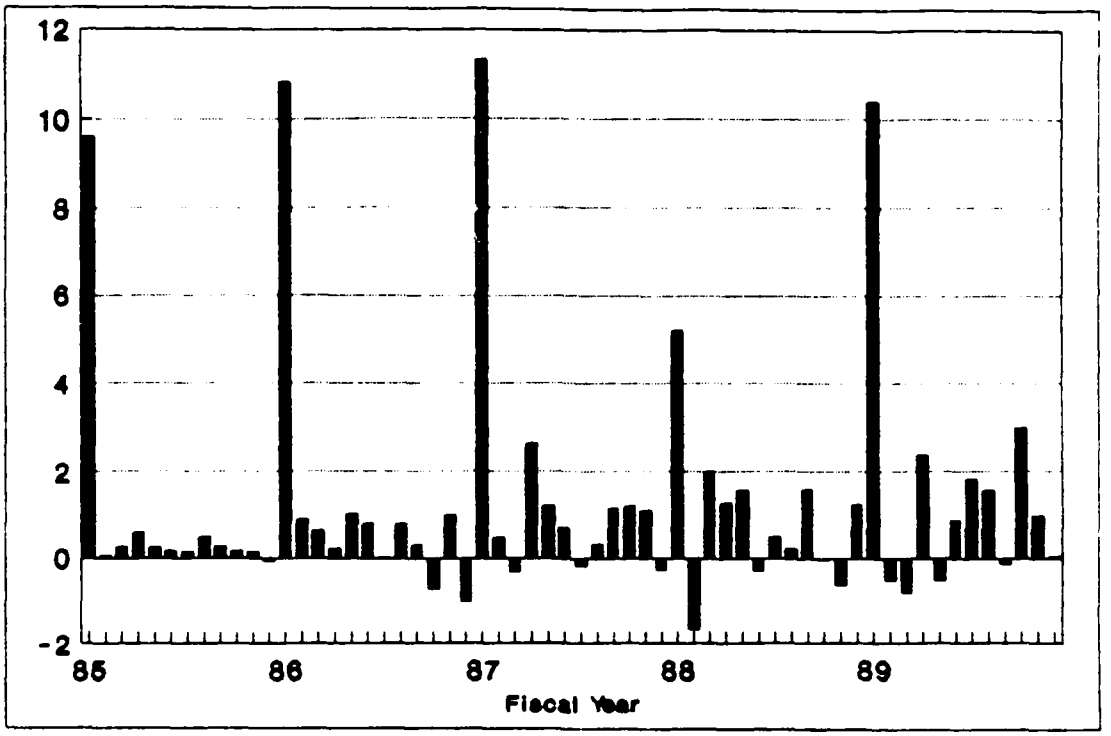

Figure 22. Monthly Gains and Losses ($ Billion)
Wilshire Index - 50% MRS Fund Invested

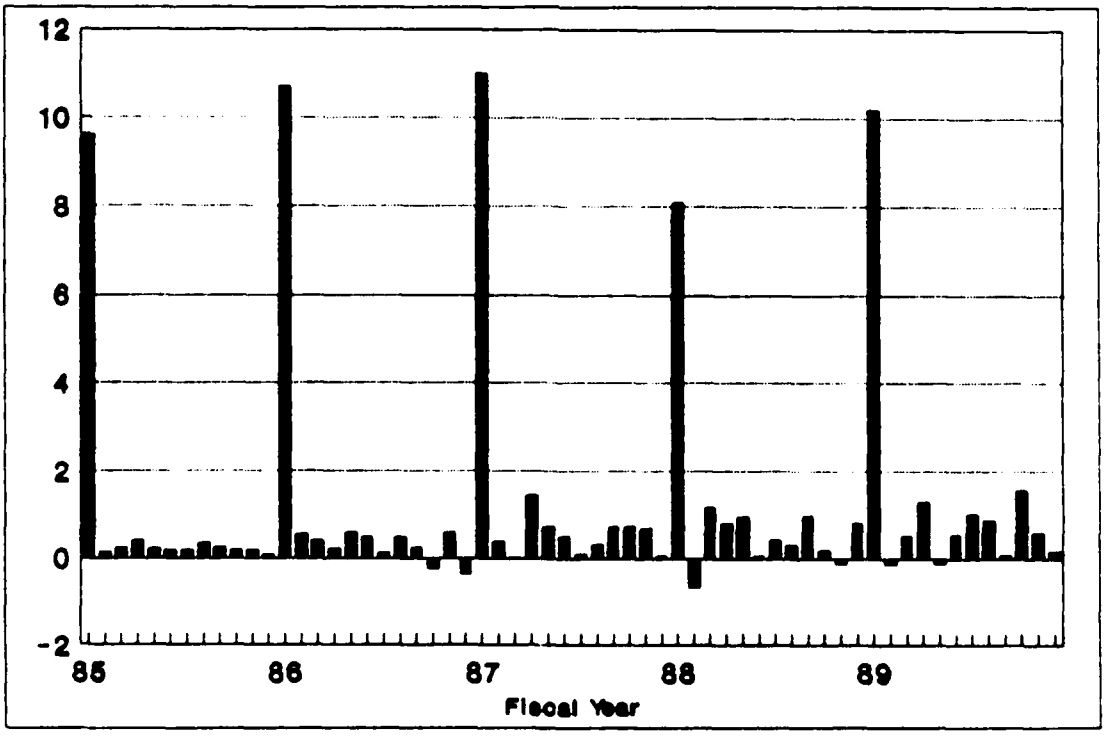

Figure 23. Monthly Gains and Losses ($ Billion)
Wilshire Index - 25% MRS Fund Invested

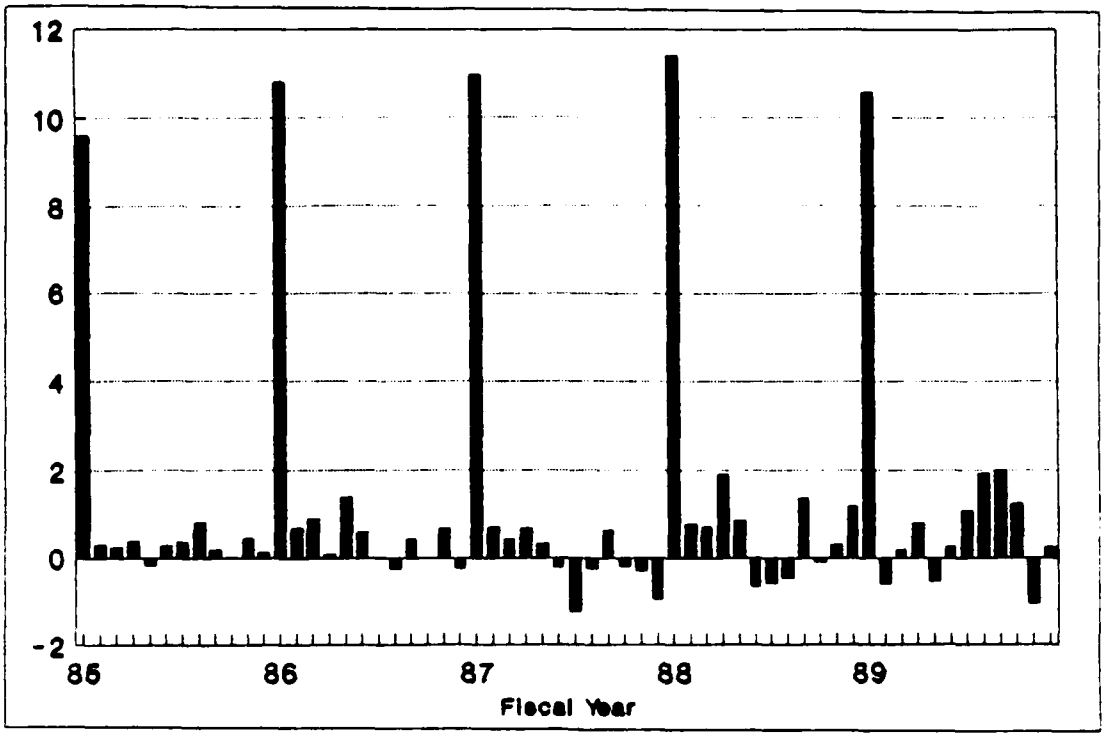

Figure 24. Monthly Gains and Losses ($ Billion)
Merrill Index - 100% MRS Fund Invested

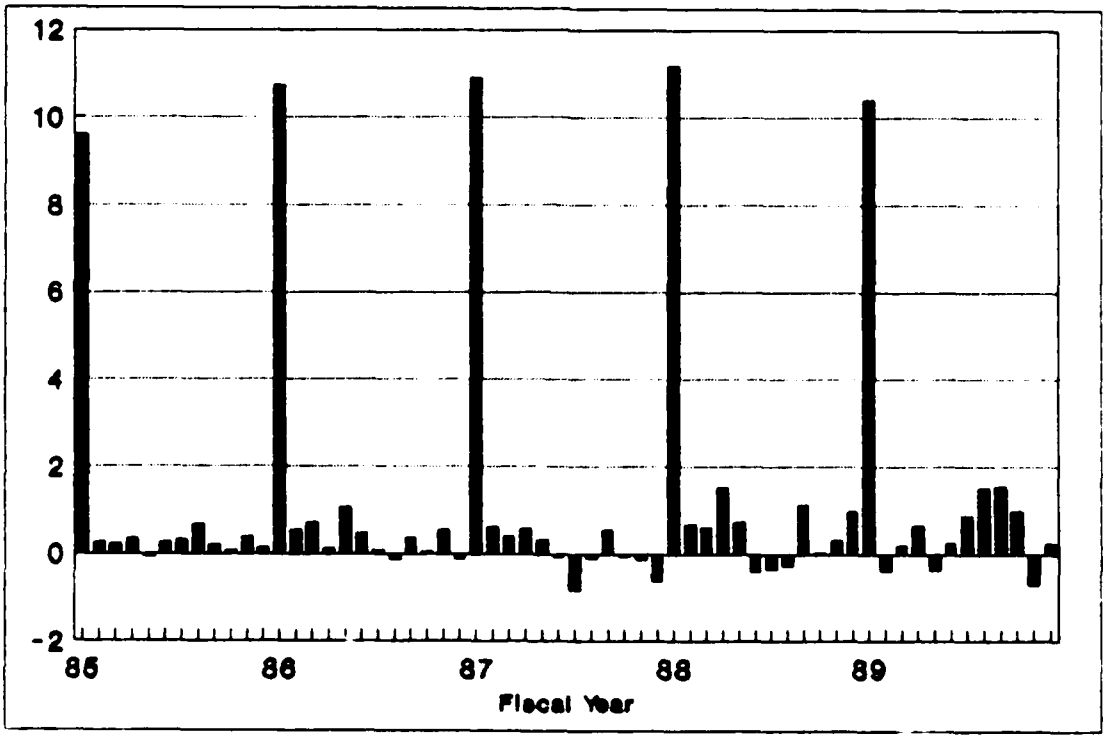

Figure 25. Monthly Gains and Losses ($ Billion)
Merrill Index - 75% MRS Fund Invested

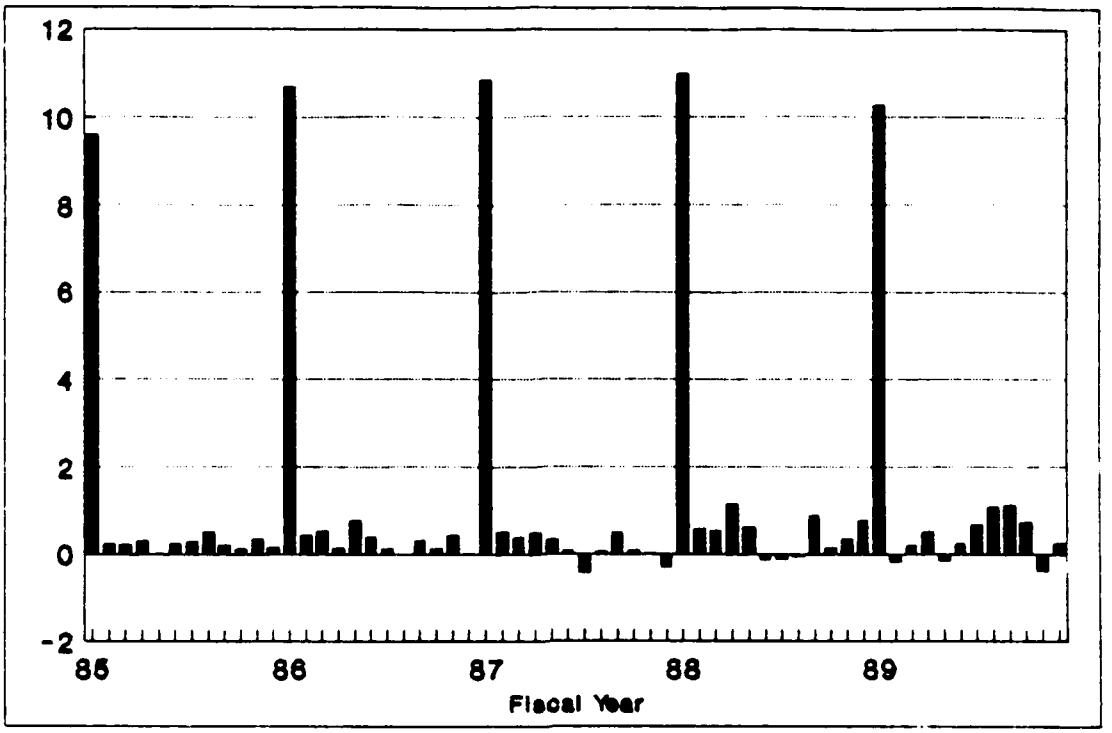

Figure 26. Monthly Gains and Losses ($ Billion)
Merrill Index - 50% MRS Fund Invested

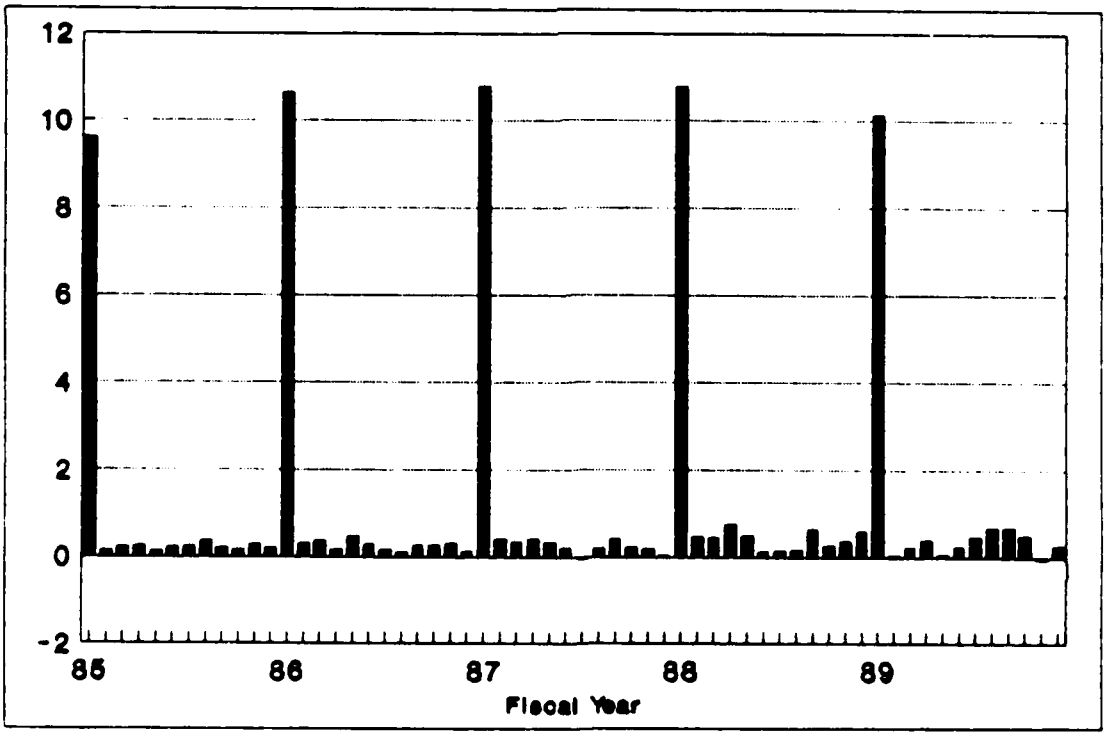

Figure 27. Monthly Gains and Losses ($ Billion)
Merrill Index - 25% MRS Fund Invested

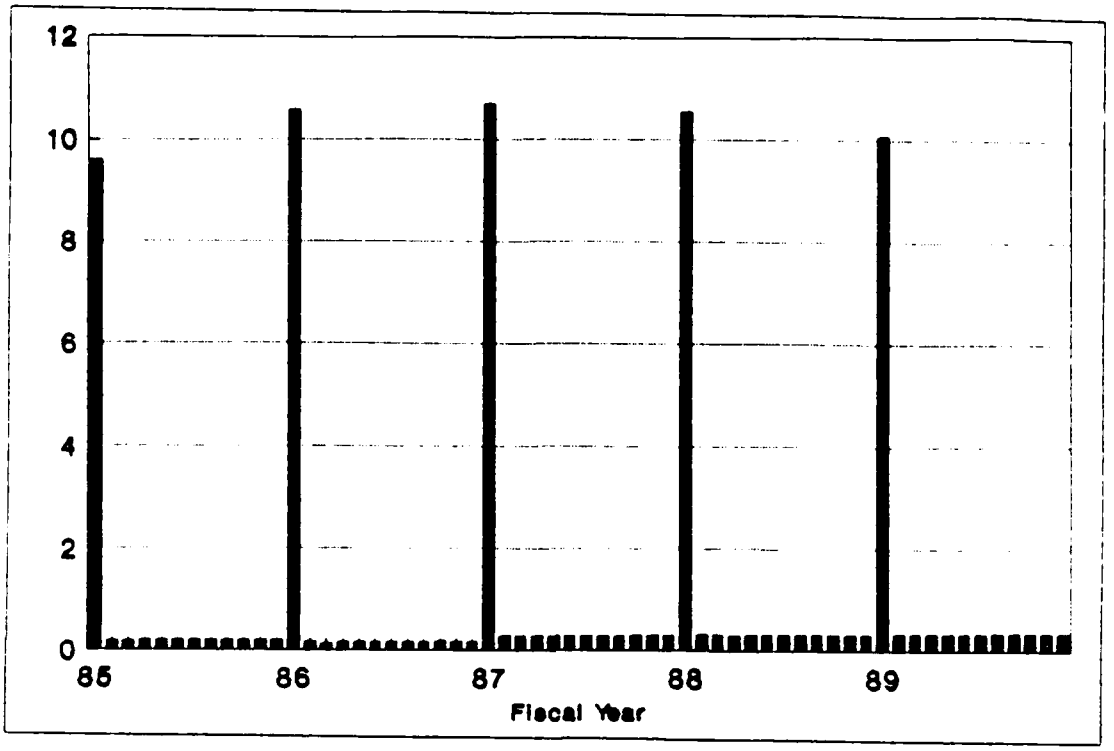

Figure 28. Monthly Gains and Losses ($ Billion)
Life Insurance - 100% MRS Fund Invested

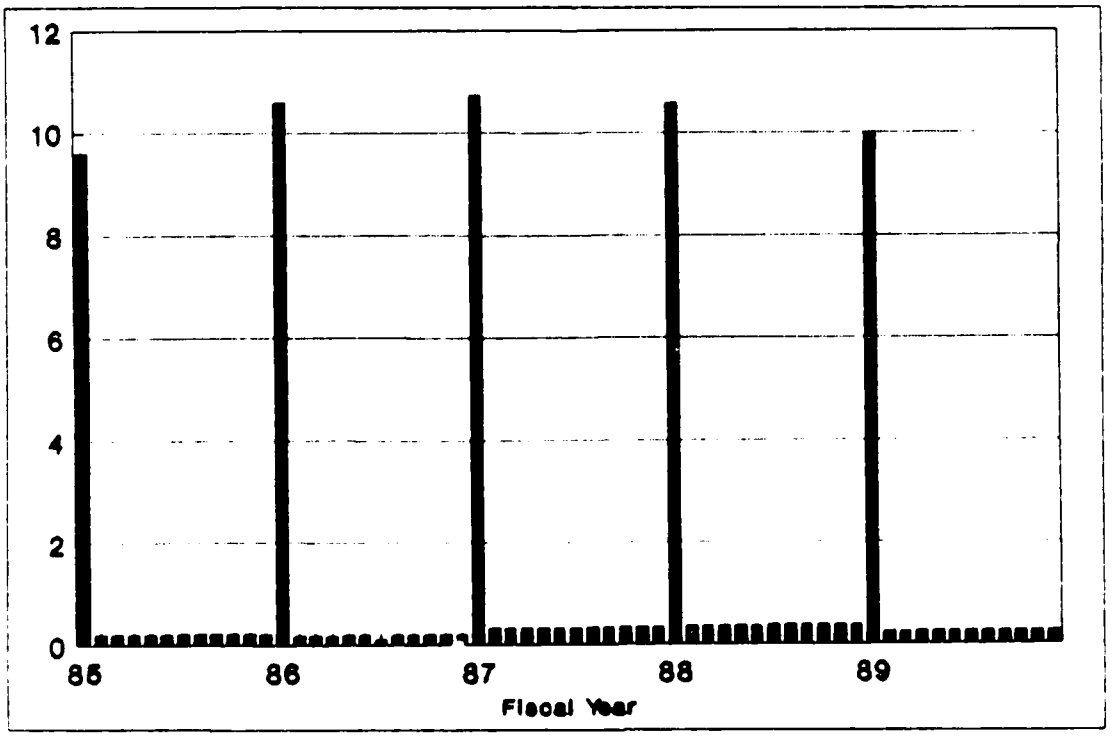

Figure 29. Monthly Gains and Losses ($ Billion)
Treasury Issues - 100% MRS Fund Invested

index plans. The life insurance plan and the current method of investing MRS funds in Treasury issues provided similar constant net gains over the five years and no net losses.

Conclusions. When various levels of MRS funds were invested in the life insurance plan, like the Treasury investment approach, the MRS fund experienced monthly gains and no losses; however, in exchange for these stable gains there was no opportunity to exceed a relatively fixed level of investment income. In contrast, the MRS fund had large monthly gains compared to the current MRS funding approach; however, the fund had to sustain some monthly net losses. Comparing the monthly gains and losses charts for the three index plans with their corresponding end-of-year fund balances charts, it may be noted that despite the variability in the net gains, the end-of-year balances over the five year period were either the same or higher than those of the current MRS funding approach; this result suggests that the cumulative net gains from the stock and bond index plans potentially average out the effects of net losses.

Annual Rates of Return

Calculations. Table 8 displays the fiscal annual rates of return for the investment plans between 1985 and 1989 under the assumption that 100 percent of the MRS funds were invested in the private sector. These returns were calculated as annual investment income divided by net annual fund receipts (total receipts minus total expenditures). These rates vary from the published annual rates of return (Table 9) because

they reflect the rates of returns over a fiscal year period versus a calendar year period. However when the five year average rates of return are compared, the fiscal rates and the calendar rates are relatively the same. Tables 10 - 12 display the fiscal annual rates of return for the investment plans when 75, 50 and 25 percent of the MRS fund was assumed invested in the private sector.

Table 8

Fiscal Annual Rates Of Return (%)
100% MRS Invested In Private Sector

() => negative value

	1985	1986	1987	1988	1989	Ave
S&P 500	13.08	29.46	41.20	(8.73)	32.69	21.54
Wilshire 5000	12.80	27.98	36.26	(7.21)	31.35	20.23
Merrill Lynch	17.19	20.57	(0.23)	14.45	12.08	12.81
Treasury	10.93	10.91	10.28	9.93	6.92	9.79
Life Insurance	9.53	9.53	9.07	9.06	9.00	9.24

Table 9

Published Annual Rates of Return (%)

	1985	1986	1987	1988	1989	Ave
S&P 500	32.03	18.54	5.22	16.82	32.35	20.99
Wilshire 5000	32.56	16.09	2.27	17.94	29.15	19.06
Merrill Lynch	25.35	16.30	1.84	9.75	14.11	13.47
Treasury (30 yr)	10.80	7.80	8.60	9.00	8.50	8.94
Life Insurance	9.63	9.35	9.09	9.03	9.00	9.22

Table 10

Fiscal Annual Rates Of Return (%)
75% MRS Invested In Private Sector

() => negative value

	1985	1986	1987	1988	1989	Ave
S&P 500	12.61	24.92	32.21	(3.50)	25.91	18.43
Wilshire 5000	12.42	23.86	29.48	(2.35)	24.93	17.66
Merrill Lynch	15.60	18.12	2.32	13.34	10.78	12.03

Table 11

Fiscal Annual Rates Of Return (%)
50% MRS Invested In Private Sector

	1985	1986	1987	1988	1989	Ave
S&P 500	12.14	20.32	25.11	1.27	19.36	15.64
Wilshire 5000	11.96	23.29	22.88	2.11	18.71	15.79
Merrill Lynch	14.01	15.73	4.92	12.21	9.49	11.27

Table 12

Fiscal Annual Rates Of Return (%)
25% MRS Invested In Private Sector

	1985	1986	1987	1988	1989	Ave
S&P 500	11.49	15.60	17.52	6.27	13.39	12.85
Wilshire 5000	11.49	15.38	16.47	6.22	12.84	12.48
Merrill Lynch	12.42	13.30	7.58	11.09	8.21	10.52

Annual Real Interest Rates. It may be recalled from Section Two that Henry, in his analysis of the private sector approach, devised several criteria by which an investment plan could be viewed as a acceptable alternative to the current fund investment plan. One of these criteria was that the

investment plan must show a competitive annual rate of return after adjusting the rate for inflation, investment management costs and "interest incurred by Treasury securities that are issued to generate "actual" money for the MRS" (Henry, 1987:54). This criteria was applied to the annual rates of return for the investment plans when 100 percent of the MRS fund was assumed invested in the private sector (Table 8). The real rates of return were calculated for the assumptions that the money for the new MRS was generated either completely through Treasury issues or completely through taxes. The results are displayed in Tables 13 - 14; the figures in Tables 13 - 14 were derived using Henry's methodology. Four percent was the assumed rate of inflation; this figure was derived by averaging the consumer price indexes, as published in the November 10, 1989 Value Line Survey, for years 1984 through 1989.

The average real annual rates of the stock index plans over the five year period are higher than the other investment plans under both the Treasury and tax cash generation methods; however, the real rates on an annual basis suggest a high degree of fluctuation. The annual rates of the bond index plan show similar fluctuation on a smaller scale; furthermore, under the Treasury cash generation method the average rate of return of this plan is less than the Treasury plan rate of return. The life insurance plan compares relatively the same against the Treasury plan under the tax cash generation method; however, when evaluated in terms of real rates under

the Treasury cash generation method, the life insurance plan compares poorly.

Table 13

Real Annual Rates Of Return (%)
Funded Through 100% Treasury Issues
100% MRS Fund Invested

	1985	1986	1987	1988	1989	Ave
( ) => negative value						
S&P 500	2.15	18.55	30.92	(18.66)	25.77	11.75
Wilshire 5000	1.87	17.07	25.98	(17.21)	24.43	10.43
Merrill Lynch	6.26	9.66	(10.51)	4.52	5.16	3.02
Treasury	6.93	6.91	6.28	5.93	2.92	5.79
Life Insurance	(1.40)	(1.38)	(1.21)	(0.87)	2.08	(2.78)

Table 14

Real Annual Rates Of Return (%)
Funded Through 100% Taxes
100% MRS Fund Invested

	1985	1986	1987	1988	1989	Ave
( ) => negative value						
S&P 500	9.08	25.46	37.20	(12.73)	28.69	17.54
Wilshire 5000	8.80	23.98	32.26	(11.28)	27.35	16.22
Merrill Lynch	13.19	16.57	(4.23)	10.45	8.08	8.81
Treasury	6.93	6.91	6.28	5.93	2.92	5.79
Life Insurance	5.53	5.53	5.07	5.06	5.00	5.24

V. CONCLUSIONS AND RECOMMENDATIONS

Introduction

The objective of this thesis was to evaluate the benefits of an MRS funded by private sector investments if administrative and regulatory constraints were taken into account. In order to meet this objective, the MRS monthly flow of receipts and expenditures for three index plans and a life insurance investment plan were evaluated for the five year period that accrual accounting has been in effect; these investment plans reflected assumptions made about the administration and regulation of an MRS funded by private sector investments.

Evaluation of the MRS private sector approach over a five year period does not provide a strong historical basis for making conclusions and recommendations about the private sector approach. However, every attempt was made to apply past data (as opposed to estimated data) into the analysis to approximate as closely as possible what the MRS fund would have actually earned if it had been invested in the private sector between fiscal years 1985 through 1989. Given that the results from this analysis reasonably estimate the effects of a private sector approach when applied to the MRS over the five year period, some valid conclusions and recommendations may be derived from this analysis.

Conclusions

Private Sector Investment Plans. The results from analyzing the MRS flow of funds suggest that between fiscal years 1985 to 1989, a stock index plan, and to a lesser extent, a corporate bond index plan, improved the cumulative investment returns of the MRS fund; the price for this improvement was periods of volatility resulting in short term losses on investment. A highly regulated plan such as the life insurance plan provided approximately the same investment returns as the current MRS investment approach with no volatility. The results also suggest that improved investment returns may be achieved when less than 100 percent of the MRS fund was invested in the private sector; this method also reduced the negative effects of a volatile market.

Generating "Actual" Money. Improved MRS fund investment returns translated into equal or higher average annual investment returns with respect to the current funding approach; however, the effects of generating money to implement the private sector approach was shown to reduce the benefits under the Treasury issue method. Generating money for a Government pension program through Treasury issues is politically more feasible than raising taxes; therefore it is reasonable to assume that if a private sector approach were to be instituted, it would be financed through Treasury issues.

Results from this analysis show that there may be two ways of mitigating the effects of increasing the national debt

to finance the private sector approach. One way may be to use the surplus MRS investment returns to pay back the debt to the Treasury. For example, Figures 8 - 9 in Section Four suggest that over the five year period investigated, the stock index plans earned a total of approximately 40 billion dollars when 100 percent of the MRS fund was assumed invested in the private sector; this is more than twice than what the MRS fund earned in investment income under the current MRS investment method. This surplus could have been used to reduce the debt for the approximate 12 billion dollars generated to initiate the MRS private sector approach in 1985.

Another way of mitigating the effects of increasing the national debt to finance the new MRS would be to invest a small percentage of the MRS fund in private sector plans. Although the investment income would not be as high as investing 100 percent of the MRS fund, this method would provide some benefits to the MRS fund but would not require the massive amounts of cash to implement the private sector approach. For example, when 25 percent of the MRS fund was assumed invested in the stock index plans, four billion dollars was required to be generated to initiate the private sector appro[illegible] in 1985; as Figures 8 - 9 suggest, under this plan, a 30 percent increase in investment income was achieved compared to the current MRS investment method.

Periods of Negative Returns. Even if money were generated to implement the private sector approach, the effects of market volatility on the MRS fund further discredit

the potential benefits of the private sector approach. One of the chief advantages under the current MRS investment approach is the predictability of investment income; valuations may be made on the MRS fund with certainty that there will be no losses on investment; its principle and interest earnings are guaranteed by the creditworthiness of the U.S. Government.

If the MRS fund was invested in the stock and bond markets, valuations of the fund could not assume constant, predictable interest income; as Figures 8 - 10 suggest, the fund would experience periods of negative income under stock and bond plans.

Periods of negative returns with respect to the MRS private sector approach were shown in this analysis to be potentially manageable in three ways. One way was to invest broadly in the market through index plans and let the cumulative returns over a period of time average out the effects of the short term losses. For example, the index plans used in this analysis experienced negative earnings; however, the end-of-year balances (Figures 4 - 6) over the five year period were either the same or higher than those of the current MRS funding approach; this suggests that cumulative high returns from the stock and bond index plans potentially average out the effects of short term losses.

The second way in which periods of negative returns could be managed is through a high degree of investment plan regulation such as the life insurance investment plan. As Figure 11 suggests, periods of negative returns are not a

threat to the MRS when invested in a highly regulated manner. The third way in which periods of negative returns could be managed would be to invest only a percentage of the MRS in the private sector. The illustrations of the index plans monthly gains and losses (Figures 16 -27) suggest that as percentages of MRS fund invested in the index plans are decreased, periods of negative returns and volatility decrease.

MRS Fund Projections Under the Private Sector Approach. Projections based on this analysis cannot be made on how the private sector investment approach could benefit the MRS in the future. Although this analysis showed that the MRS fund could have experienced greater end-of-year balances resulting from improved investment returns if it had been invested in the private sector between 1985 and 1989, hindsight analysis over a five year period does not constitute historical evidence that the MRS can be financed sufficiently and consistently through private sector investments. However, there is enough historical evidence based on other studies that show that investment in the stock and bond markets, over a long period of time, guarantees a higher rate of return than simply investing in Treasury bonds. Figure 30 was adapted directly from one such study and illustrates the long term benefits of investing in the private sector for various investment plans.

The graphs in Figure 30 represent the results from simulations of returns of various investment portfolios between 1926 and 1984. They show the ending values of one

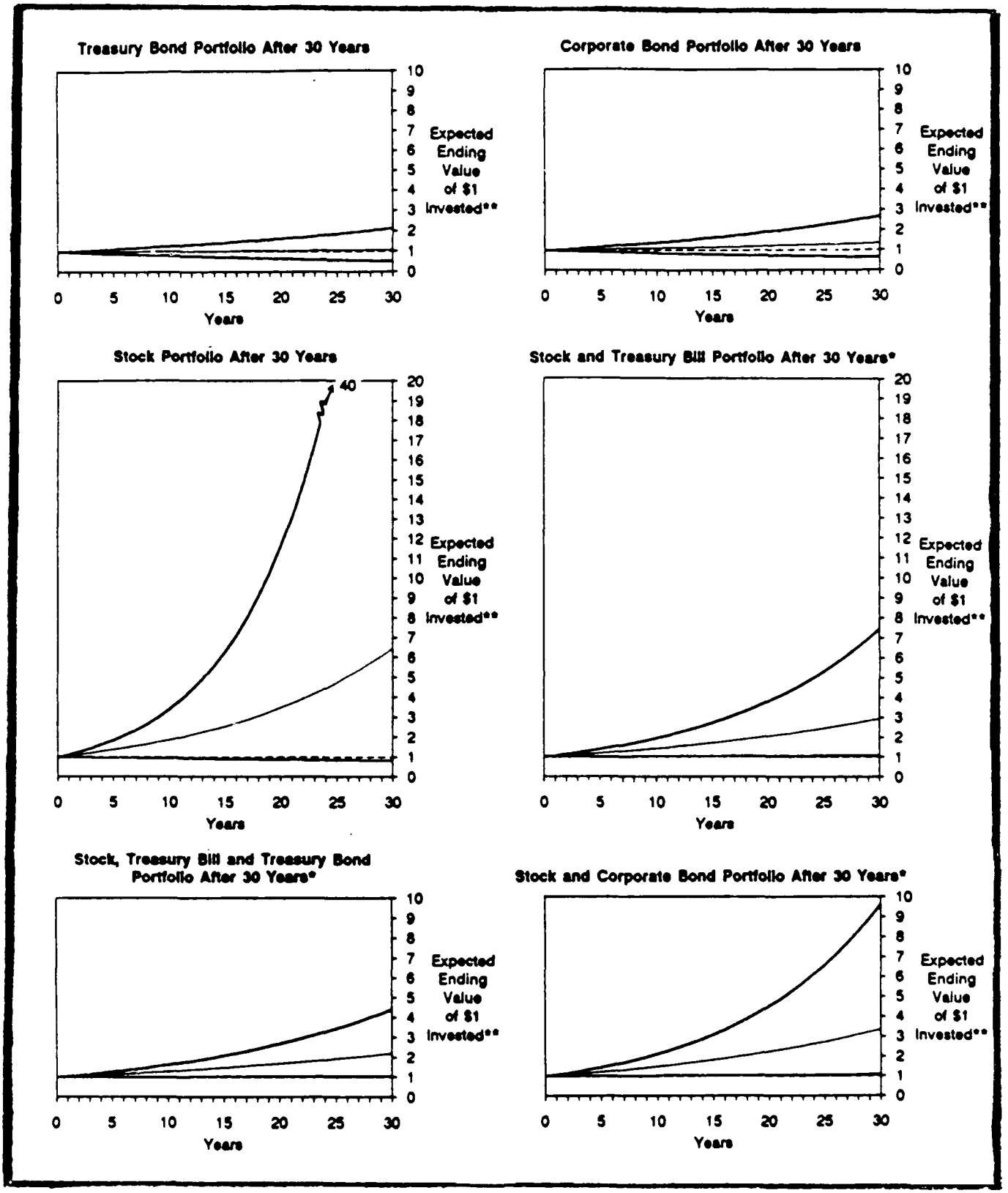

Figure 30. Results of Long Term Investing for Various Portfolios (Reichenstein, 1989:13)

dollar under different investment plans if it were invested continuously over 30 years. The outer lines represent the lower and upper bounds of possible ending values, while the middle line represents the most likely ending values (Reichenstein, 1989:12-14). The graphs in comparison illustrate that, over a 30 year period, the investment plans which include stock never return less than a plan that consists only of Treasury securities. This is an important result with respect to the MRS private sector approach; what this result suggests is that the private sector approach, although not a guarantee of higher investment earnings for the MRS, almost certainly will not provide less investment earnings than the current MRS investment approach over a long time horizon.

MRS Cost. Projected funding of the MRS is high. Figure 31 illustrates this cost by comparing the projected total MRS fund receipts (normal cost payments plus unfunded liability payments plus interest income) with projected total fund disbursements. Two things are evident from this chart: fund receipts exceed fund expenses and receipts do not decline even when the unfunded liability is paid off in 2043. The reason for this continual rise in required MRS revenue is due to the assumption, used by the DOD Actuary to project MRS fund data, that military base pay beyond 1995 increases at an annual rate of 5.75 percent;

> a major portion of the investment income must be used to support the 5.75 percent increases in the fund and cannot be made available to pay benefits. For example, in the year 2063, the normal cost payment is $824 billion and

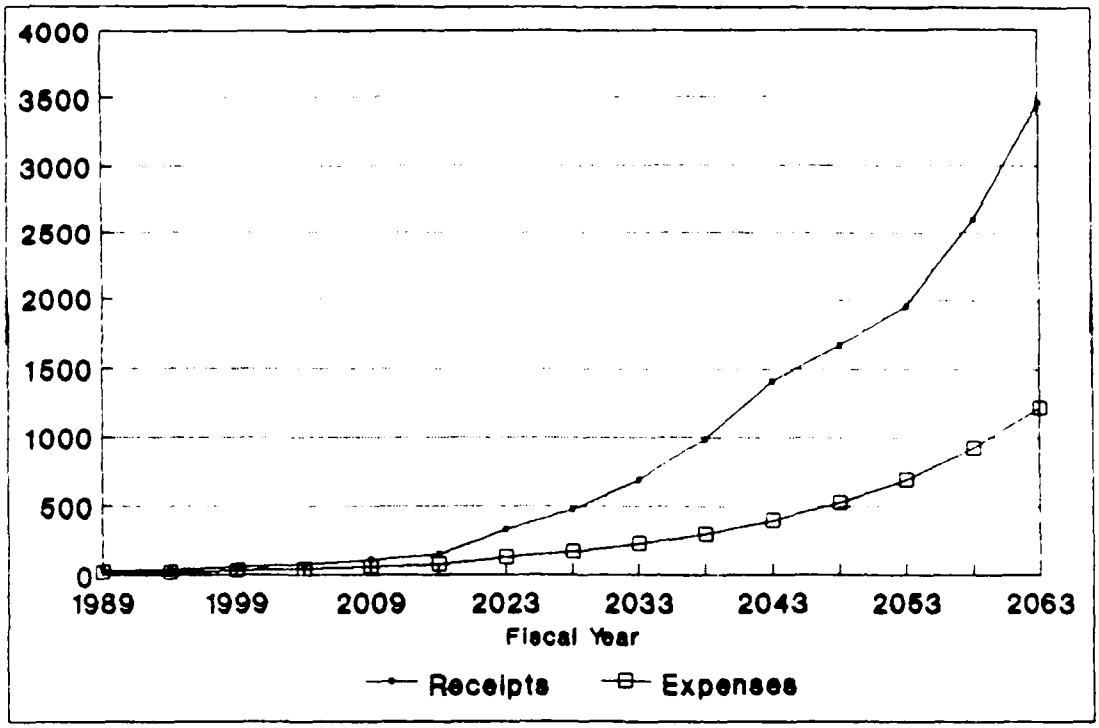

Figure 30. MRS Project Receipts vs Expenditures ($ Billion)

> the investment income is $2,783 billion, while fund disbursements are $1,216 billion. While the two major sources of income to the trust fund are not set aside for specific purposes, they will approximately equal benefit payments plus 5.75 percent of the fund balance. For 2063, $824 billion plus $2,783 billion is approximately equal to $1,216 billion plus $2,397 billion, the amount that would be required for the fund to increase by 5.75 percent. (Office of the Actuary, 1988:8)

There is a less obvious MRS cost that is important to consider; what is called MRS investment income is actually a transfer of Federal funds from one Treasury account to another, that is, from the Treasury's General Fund to a specific Treasury fund called the Military Retirement Fund. In other words, the MRS investment income does not reflect actual cash that the MRS fund has earned by investing its assets; rather, the investment income is an obligation by the

Treasury to transfer back to the MRS fund the principle and interest it charged itself to borrow the MRS funds for other operations funded by the Federal Government. The MRS private sector investment approach, on the other hand, results in investment income that is actual cash.

Recommendations for Further Research

Operations of Government. MRS funds that are held in Treasury issues to pay for future fund expenses are used by the Government to finance other Federal operations (Moraglio, 1986:94). If the Government were to institute a private sector approach to financing the MRS, some or all of the funds that are held in trust under the current plan would not be available for the Federal Government to use for other obligations. How the private sector approach to financing the MRS could affect Government operations overall requires further analysis.

Effect on Market. If MRS funds were invested in the economy, it is possible that the size of such investments would affect the prices of stocks and bonds. According to a representative from the Investment Company Institute,

> it would not be a problem for the "private sector" market to absorb the $15 to $20 billion in assets from a large government pension fund. One assumes, naturally, these funds would be conservatively invested and invested across time. It should not materially influence the price of stocks and/or bonds if handled in a routine manner. (Hart, 1989)

The private sector investment approach could have little

effect on the market if implemented across time in a manner patterned after large private pension funds. However, further analysis is required to substantiate this.

Other Nations. It is possible that other countries in the world have governments that invest in their domestic equity and corporate bond markets to finance their operations. If so, data on the effects that the private sector approach to financing the MRS might have on the U.S. marketplace and on Government operation could be obtained from research on these countries.

Downward Trends in the Market. This analysis studied the benefits of investing MRS funds in the private sector from 1985, when accrual accounting went into effect, to 1989; during this period, the stock market was experiencing growth in stock prices. If during this period the stock market had been in a decline, the results of this analysis would have been different. The long term benefits of investing in the market and the benefits resulting from investing when the market is on the rise, were discussed and illustrated in this study; however, the effects of intermediate declines in the market on the MRS private sector approach were not addressed. Further analysis on this is recommended to more completely understand the benefits of private sector approach to funding the MRS.

Appendix A: Monthly Rates of Return Used in the Model

Month/Year		S&P	WILSH	MerLyn	Treas	Insurance
October	84	0.212	-0.013	4.59	1.00	0.80
November	84	-1.014	-1.079	1.96	1.00	0.80
December	84	2.531	2.434	1.32	1.00	0.80
January	85	7.676	8.652	2.82	1.00	0.90
February	85	1.373	1.697	-2.55	1.00	0.90
March	85	0.193	-0.134	1.81	1.00	0.90
April	85	-0.323	-0.199	2.47	1.00	0.90
May	85	6.070	5.737	6.40	1.00	0.90
June	85	1.577	1.845	0.72	1.00	0.90
July	85	-0.294	-0.020	-0.72	1.00	0.90
August	85	-0.642	-0.355	2.91	1.00	0.90
September	85	-3.222	-3.910	0.06	1.00	0.90
October	85	4.479	4.451	2.49	0.90	0.80
November	85	7.159	6.933	2.97	0.90	0.80
December	85	4.728	4.541	3.73	0.90	0.80
January	86	0.433	1.074	0.37	0.90	0.80
February	86	7.644	7.402	5.54	0.90	0.80
March	86	5.558	5.363	2.25	0.90	0.80
April	86	-1.203	-0.684	0.18	0.90	0.80
May	86	5.485	5.091	-0.86	0.90	0.80
June	86	1.664	1.369	1.63	0.90	0.75
July	86	-5.692	-5.970	0.05	0.90	0.75
August	86	7.478	6.621	2.50	0.90	0.75
September	86	-8.222	-7.963	-0.73	0.90	0.75
October	86	5.564	5.041	1.58	0.843	0.75
November	86	2.565	1.499	1.78	0.843	0.75
December	86	-2.656	-2.480	1.06	0.843	0.75
January	87	13.438	12.804	1.62	0.843	0.75
February	87	4.128	4.898	0.73	0.843	0.75
March	87	2.720	2.399	-0.53	0.843	0.75
April	87	-0.876	-1.667	-3.09	0.843	0.75
May	87	1.026	0.529	-0.62	0.843	0.75
June	87	4.990	4.476	1.56	0.843	0.75
July	87	4.976	4.449	-0.50	0.843	0.75
August	87	3.849	3.884	-0.80	0.843	0.75
September	87	-2.191	-2.111	-2.44	0.843	0.75
October	87	-21.545	-22.779	2.97	0.8025	0.75
November	87	-8.188	-7.130	1.63	0.8025	0.75
December	87	7.395	7.294	1.49	0.8025	0.75
January	88	4.257	4.340	3.83	0.8025	0.73
February	88	4.705	5.281	1.68	0.8025	0.73
March	88	-3.027	-1.675	-1.14	0.8025	0.73
April	88	1.082	1.123	-0.99	0.8025	0.73
May	88	0.789	0.204	-0.76	0.8025	0.73
June	88	4.664	5.152	2.68	0.8025	0.73
July	88	-0.398	-0.719	-0.07	0.8025	0.73
August	88	-3.314	-2.820	0.66	0.8025	0.73
September	88	4.244	3.817	2.27	0.8025	0.73

Appendix A (cont.): Monthly Rates of Return Used in the Model

Month/Year		S&P	WILSH	MerLyn	Treas	Insurance
November	88	-1.420	-1.744	-0.73	0.56	0.73
December	88	1.810	2.155	0.44	0.56	0.73
January	89	7.227	6.812	1.38	0.56	0.72
February	89	-2.485	-1.668	-0.65	0.56	0.72
March	89	2.361	2.274	0.56	0.56	0.72
April	89	5.159	4.916	1.82	0.56	0.72
May	89	4.041	4.061	3.07	0.56	0.72
June	89	-0.546	-0.577	3.09	0.56	0.72
July	89	8.985	7.876	1.92	0.56	0.72
August	89	1.934	2.272	-1.30	0.56	0.72
September	89	-0.393	-0.173	0.50	0.56	0.72

Appendix B: Raw Data Represented in the Graphs in Section Four

() => negative

MRS Fund End Of Fiscal Year Balance ($ Billion)

Plan: 100% MRS Fund Invested In Private Sector

Plan/Year	1984	1985	1986	1987	1988	1989
100% Treasury	0.0	11.87	24.59	38.90	53.40	66.12
S&P500	0.0	12.10	28.98	55.99	59.95	90.68
Wil5000	0.0	12.07	28.62	53.55	58.68	88.09
MerLynch Corporate	0.0	12.54	27.53	38.12	54.73	70.76
Insurance Plan	0.0	11.72	24.12	37.96	51.99	65.83

Plan: 75% MRS Fund Invested In Private Sector

Plan/Year	1984	1985	1986	1987	1988	1989
100% Treasury	0.0	11.87	24.59	38.90	53.40	66.12
S&P500	0.0	12.05	27.91	50.16	57.75	83.28
Wil5000	0.0	12.03	27.69	49.68	57.98	82.91
MerLynch Corporate	0.0	12.37	26.78	38.33	54.44	69.63

Plan: 50% MRS Fund Invested In Private Sector

Plan/Year	1984	1985	1986	1987	1988	1989
100% Treasury	0.0	11.87	24.59	38.90	53.40	66.12
S&P500	0.0	11.99	26.81	46.91	57.34	78.46
Wil5000	0.0	11.98	26.74	45.99	56.88	77.49
MerLynch Corporate	0.0	12.20	26.04	38.53	54.13	68.48

Plan: 25% MRS Fund Invested In Private Sector

Plan/Year	1984	1985	1986	1987	1988	1989
100% Treasury	0.0	11.87	24.59	38.90	53.40	66.12
S&P500	0.0	11.93	25.70	42.77	55.52	72.25
Wil5000	0.0	11.93	25.78	42.48	55.44	71.96
MerLynch Corporate	0.0	12.03	25.30	38.72	53.79	67.31

Appendix B (cont.): Raw Data Represented in the Graphs in Section Four

() => negative

MRS Fund Investment Income Per Fiscal Year ($ Billion)

Plan: 100% MRS Fund Invested In Private Sector

Plan/Year	1984	1985	1986	1987	1988	1989
100% Treasury	0.0	1.17	2.42	3.63	4.83	4.28
S&P500	0.0	1.40	6.60	16.35	(5.74)	22.35
Wil5000	0.0	1.37	6.26	14.26	(4.56)	21.03
MerLynch Corporate	0.0	1.84	4.70	(0.09)	6.91	7.63
Insurance Plan	0.0	1.02	2.10	3.16	4.32	5.44

Plan: 75% MRS Fund Invested In Private Sector

Plan/Year	1984	1985	1986	1987	1988	1989
100% Treasury	0.0	1.17	2.42	3.63	4.83	4.28
S&P500	0.0	1.35	5.57	12.44	(2.10)	17.14
Wil5000	0.0	1.33	5.33	11.32	(1.40)	16.55
MerLynch Corporate	0.0	1.67	4.11	0.87	6.41	6.78

Plan: 50% MRS Fund Invested In Private Sector

Plan/Year	1984	1985	1986	1987	1988	1989
100% Treasury	0.0	1.17	2.42	3.63	4.83	4.28
S&P500	0.0	1.30	4.53	9.42	0.72	12.73
Wil5000	0.0	1.28	5.19	8.57	1.18	12.22
MerLynch Corporate	0.0	1.50	3.54	1.81	5.89	5.94

Plan: 25% MRS Fund Invested In Private Sector

Plan/Year	1984	1985	1986	1987	1988	1989
100% Treasury	0.0	1.17	2.42	3.63	4.83	4.28
S&P500	0.0	1.23	3.47	6.38	3.04	8.33
Wil5000	0.0	1.23	3.42	6.01	3.25	8.20
MerLynch Corporate	0.0	1.33	2.97	2.73	5.37	5.11

Appendix B (cont.): Raw Data Represented in the Graphs in Section Four

() => negative

Annual Investment Management Cost ($ Million)

Calculated as follows:

(.35%)(Quarterly Average Percent Return On Private Sector Plan)(Amount Of MRS Fund Invested In Private Sector)

Assumed: if quarterly average percent return was negative, the investment firm received no fee for that quarter.

Plan: 100% Invested In Private Sector

Plan/Year	1984	1985	1986	1987	1988	1989
100% Treasury	0.0	0.0	0.0	0.0	0.0	0.0
S&P500	0.0	2.41	11.31	21.61	8.75	28.21
Wil5000	0.0	2.43	11.16	18.96	9.63	26.38
MerLynch Corporate	0.0	2.80	5.97	2.88	8.66	9.26
Insurance Plan	0.0	1.31	2.57	3.82	5.17	6.47

Plan: 75% Invested In Private Sector

Plan/Year	1984	1985	1986	1987	1988	1989
100% Treasury	0.0	0.0	0.0	0.0	0.0	0.0
S&P500	0.0	1.78	8.16	14.77	6.32	19.84
Wil5000	0.0	1.79	8.07	13.36	7.14	18.96
MerLynch Corporate	0.0	2.08	4.37	2.11	6.46	6.88

Plan: 50% Invested In Private Sector

Plan/Year	1984	1985	1986	1987	1988	1989
100% Treasury	0.0	0.0	0.0	0.0	0.0	0.0
S&P500	0.0	1.17	5.23	9.38	4.18	12.70
Wil5000	0.0	1.17	5.19	8.35	4.68	12.03
MerLynch Corporate	0.0	1.37	2.84	1.37	4.28	4.54

Plan: 25% Invested In Private Sector

Plan/Year	1984	1985	1986	1987	1988	1989
100% Treasury	0.0	0.0	0.0	0.0	0.0	0.0
S&P500	0.0	0.57	2.51	4.36	2.03	5.97
Wil5000	0.0	0.58	2.50	3.91	2.28	5.70
MerLynch Corporate	0.0	0.68	1.39	0.67	2.13	2.24

Appendix B (cont.): Raw Data Represented in the Graphs in Section Four

() => negative

MRS Fund Monthly Gain/Loss ($ Billion)

Plan: 100% Treasury MRS Fund Invested

Month/Fiscal Year	1985	1986	1987	1988	1989
Oct	9.6000	10.5890	10.7223	10.5627	9.9828
Nov	0.1960	0.1851	0.3128	0.3475	0.2387
Dec	0.1979	0.1867	0.3154	0.3503	0.2401
Jan	0.1999	0.1884	0.3181	0.3531	0.2414
Feb	0.2019	0.1901	0.3208	0.3559	0.2428
Mar	0.2039	0.1918	0.3235	0.3588	0.2441
Apr	0.2059	0.1035	0.3262	0.3617	0.2455
May	0.2080	0.1953	0.3290	0.3646	0.2469
Jun	0.2101	0.1970	0.3317	0.3675	0.2483
Jul	0.2122	0.1988	0.3345	0.3704	0.2496
Aug	0.2143	0.2006	0.3374	0.3734	0.2410
Sept	0.2165	0.2024	0.3402	0.3784	0.2524

Plan: 100% S&P 500 Index Plan MRS Fund Invested

Month/Fiscal Year	1985	1986	1987	1988	1989
Oct	9.6000	11.0248	12.1276	(1.8135)	11.3184
Nov	0.0026	1.6383	1.0695	(4.4857)	(1.1284)
Dec	0.3428	1.1489	(1.1080)	3.6256	1.1505
Jan	0.8634	0.0951	5.5344	2.2204	5.0357
Feb	0.2484	1.9707	1.9389	2.5638	(2.0131)
Mar	0.1201	1.5334	1.3239	(1.8122)	1.6319
Apr	0.0638	(0.3719)	(0.4218)	0.5596	3.8016
May	0.7823	1.5811	(0.5223)	0.3991	3.1061
Jun	0.2885	0.4920	2.5055	2.6164	(0.5771)
Jul	0.0638	(1.7934)	2.6262	(0.2876)	7.2761
Aug	0.0205	2.1827	2.1359	(2.0239)	1.6155
Sept	(0.2994)	(2.6150)	(1.2435)	2.3929	(0.4858)

Appendix B (cont.): Raw Data Represented in the Graphs in Section Four

() => negative

MRS Fund Monthly Gain/Loss ($ Billion)

Plan: 75% S&P 500 Index Plan MRS Fund Invested

Month/Fiscal Year	1985	1986	1987	1988	1989
Oct	9.6000	10.9148	11.7008	2.2465	10.9455
Nov	0.0509	1.2677	0.8421	(3.1623)	(0.7518)
Dec	0.3071	0.8933	(0.6920)	2.7804	0.8991
Jan	0.6981	0.1211	4.0175	1.7158	3.7114
Feb	0.2363	1.4872	1.4342	1.9546	(1.3670)
Mar	0.1421	1.1543	1.0054	(1.2049)	1.2393
Apr	0.1008	(0.2058)	(0.1873)	0.5020	2.7873
May	0.6347	1.1840	0.4578	0.3863	2.2684
Jun	0.2678	0.4067	1.8167	1.9955	(0.3310)
Jul	0.1035	(1.2008)	1.8856	(0.1055)	5.1906
Aug	0.0718	1.6206	1.5430	(1.3578)	1.1932
Sept	(0.1646)	(1.7812)	(0.7166)	(1.8420)	(0.2533)

Plan: 50% S&P 500 Index Plan MRS Fund Invested

Month/Fiscal Year	1985	1986	1987	1988	1989
Oct	9.6000	10.8056	11.3741	5.3855	10.6259
Nov	0.0993	0.9017	0.6658	(1.9804)	(0.4086)
Dec	0.2711	0.6477	(0.3383)	2.0128	(0.6828)
Jan	0.5325	0.1452	2.7655	1.2743	2.5404
Feb	0.2246	1.0294	1.0412	1.4266	(0.7976)
Mar	0.1634	0.8051	0.7641	(0.6633)	0.9027
Apr	0.1368	(0.0568)	0.0079	0.4628	1.9105
May	0.4898	0.8217	0.4178	0.3868	1.5582
Jun	0.2479	0.3294	1.2829	1.4576	(0.1149)
Jul	0.1415	(0.6740)	1.3185	0.0652	3.4265
Aug	0.1213	1.1035	1.0970	(0.7618)	0.8520
Sept	(0.0336)	(1.0367)	(0.3049)	1.3628	(0.0556)

Appendix B (cont.): Raw Data Represented in the Graphs in Section Four

() => negative

MRS Fund Monthly Gain/Loss ($ Billion)

Plan: 25% S&P 500 Index Plan MRS Fund Invested

Month/Fiscal Year	1985	1986	1987	1988	1989
Oct	9.6000	10.6959	11.0352	8.2043	10.2952
Nov	0.1476	0.5391	0.4830	(0.7860)	(0.0736)
Dec	0.2347	0.4109	0.0027	1.1805	0.4566
Jan	0.3664	0.1671	1.5011	0.8064	1.3576
Feb	0.2131	0.5953	0.6596	0.8783	(0.2523)
Mar	0.1840	0.4832	0.5296	(0.1324)	0.5621
Apr	0.1719	0.0756	0.1801	0.4122	1.0439
May	0.3476	0.4911	0.3715	0.3768	0.8691
Jun	0.2286	0.2588	0.7752	0.8991	0.0796
Jul	0.1777	(0.2083)	0.7890	0.2249	1.7620
Aug	0.1688	0.6286	0.6853	(0.1736)	0.5305
Sept	0.0934	(0.3759)	0.0504	0.8594	0.1134

Plan: 100% Wilshire 5000 Index Plan MRS Fund Invested

Month/Fiscal Year	1985	1986	1987	1988	1989
Oct	9.6000	11.0201	11.9577	(1.9474)	10.8184
Nov	(0.0718)	1.5837	0.6232	(3.7286)	(1.3284)
Dec	0.3318	1.0988	(1.0087)	3.4424	1.3508
Jan	0.9530	0.2597	5.1612	2.1777	4.6193
Feb	0.2834	1.9098	2.2364	2.7755	(1.3530)
Mar	0.0838	1.4769	1.1455	(0.9971)	1.5324
Apr	0.0777	(0.2182)	(0.7974)	0.5713	3.5371
May	0.7458	1.4695	0.2685	0.0645	3.0453
Jun	0.3204	0.4007	2.1708	2.8267	(0.5911)
Jul	0.0753	(1.8718)	2.2562	(0.4717)	6.2089
Aug	0.0559	1.9162	2.0592	(1.6924)	1.8493
Sept	0.3870	(2.4946)	(1.1435)	2.1097	(0.2795)

Appendix B (cont.): Raw Data Represented in the Graphs in Section Four

() => negative

MRS Fund Monthly Gain/Loss ($ Billion)

Plan: 75% Wilshire 5000 Index Plan MRS Fund Invested

Month/Fiscal Year	1985	1986	1987	1988	1989
Oct	9.6000	10.9130	11.6203	1.8623	10.6057
Nov	(0.0048)	1.2297	0.5398	(2.7023)	(0.9174)
Dec	0.2990	0.8586	(0.6436)	2.7205	1.0706
Jan	0.7667	0.2413	3.8629	1.7324	3.4916
Feb	0.2623	1.4451	1.6880	2.1684	(0.9188)
Mar	0.1153	1.1161	0.9068	(0.6387)	1.1949
Apr	0.1111	(0.0972)	(0.4596)	0.5223	2.6583
May	0.6076	1.1060	0.2896	0.1463	2.2781
Jun	0.2913	0.3430	1.6369	2.2030	(0.3488)
Jul	0.1120	(1.2597)	1.6871	(0.2447)	4.5453
Aug	0.0980	1.4345	1.5401	(1.1492)	1.3890
Sept	(0.2288)	(1.7066)	(0.6788)	(1.6752)	(0.1151)

Plan: 50% Wilshire 5000 Index Plan MRS Fund Invested

Month/Fiscal Year	1985	1986	1987	1988	1989
Oct	9.6000	10.8059	11.3019	5.1969	10.3929
Nov	0.0620	0.8788	0.4606	(1.6688)	(0.5146)
Dec	0.2658	0.6270	(0.3010)	1.9552	(0.7889)
Jan	0.5791	0.2236	2.6222	1.2741	2.3734
Feb	0.2416	1.0043	1.1871	1.5550	(0.5037)
Mar	0.1459	0.7828	0.6912	(0.2888)	0.8642
Apr	0.1436	0.0115	(0.1608)	0.4706	1.8079
May	0.4718	0.7738	0.3069	0.2247	1.5492
Jun	0.2632	0.2904	1.1539	1.5774	(0.1262)
Jul	0.1470	(0.7132)	1.1795	(0.0258)	2.9843
Aug	0.1384	0.9890	1.0831	(0.6169)	0.9668
Sept	(0.0754)	(0.9967)	(0.2799)	1.2357	0.0289

Appendix B (cont.): Raw Data Represented in the Graphs in Section Four

() => negative

MRS Fund Monthly Gain/Loss ($ Billion)

Plan: 25% Wilshire 5000 Index Plan MRS Fund Invested

Month/Fiscal Year	1985	1986	1987	1988	1989
Oct	9.6000	10.6987	11.0030	8.0871	10.1845
Nov	0.1290	0.5312	0.3855	(0.6463)	(0.1269)
Dec	0.2321	0.4036	0.0192	1.1613	0.5111
Jan	0.3901	0.2066	1.4408	0.8122	1.2850
Feb	0.2215	0.5868	0.7324	0.9480	(0.1143)
Mar	0.1754	0.4757	0.4978	0.0461	0.5462
Apr	0.1752	0.1088	0.1010	0.4173	1.0004
May	0.3385	0.4715	0.3206	0.2986	0.8700
Jun	0.2361	0.2424	0.7202	0.9626	0.0738
Jul	0.1804	(0.2278)	0.7304	0.1809	1.5480
Aug	0.1772	0.5787	0.6842	(0.1058)	0.5872
Sept	0.0730	(0.3610)	0.0587	0.8008	0.1520

Plan: 100% Merrill Lynch Index Plan MRS Fund Invested

Month/Fiscal Year	1985	1986	1987	1988	1989
Oct	9.6000	10.7952	10.9501	11.3828	10.5648
Nov	0.2881	0.6760	0.7001	0.7575	(0.5931)
Dec	0.2296	0.8760	0.4283	0.6959	0.1673
Jan	0.3853	0.0750	0.6568	1.9023	0.7789
Feb	(0.1678)	1.3659	0.3090	0.8386	(0.5431)
Mar	0.2868	0.5728	(0.2009)	(0.6643)	0.2472
Apr	0.3623	0.0134	(1.2328)	(0.5744)	1.0731
May	0.8030	(0.2486)	(0.2277)	(0.4481)	1.9231
Jun	0.1835	0.4176	0.6221	1.3440	1.9894
Jul	0.0138	(0.0034)	(0.1827)	(0.0867)	1.2342
Aug	0.4487	0.6604	(0.2998)	0.3021	(1.0469)
Sept	0.1071	(0.2202)	(0.9381)	1.1649	0.2353

Appendix B (cont.): Raw Data Represented in the Graphs in Section Four

() => negative

MRS Fund Monthly Gain/Loss ($ Billion)

Plan: 75% Merrill Lynch Index Plan MRS Fund Invested

Month/Fiscal Year	1985	1986	1987	1988	1989
Oct	9.6000	10.7419	10.8888	11.1814	10.4172
Nov	0.2651	0.5499	0.5973	0.6551	(0.3807)
Dec	0.2216	0.6964	0.3984	0.6092	0.1859
Jan	0.3385	0.1054	0.5663	1.5111	0.6434
Feb	(0.0733)	1.0547	0.3125	0.7143	(0.3433)
Mar	0.2662	0.4693	(0.0594)	(0.3982)	0.2467
Apr	0.3232	0.0765	(0.8168)	(0.3344)	0.8651
May	0.6525	(0.1264)	(0.0832)	(0.2424)	1.4976
Jun	0.1906	0.3583	0.5478	1.1003	1.5396
Jul	0.0658	0.0520	(0.0492)	0.0293	0.9756
Aug	0.3882	0.5364	(0.1371)	0.3204	(0.7017)
Sept	0.1358	(0.1041)	(0.6156)	0.9670	0.2403

Plan: 50% Merrill Lynch Index Plan MRS Fund Invested

Month/Fiscal Year	1985	1986	1987	1988	1989
Oct	9.6000	10.6899	10.8305	10.9774	10.2709
Nov	0.2420	0.4260	0.4986	0.5527	(0.1711)
Dec	0.2137	0.5216	0.3697	0.5226	0.2042
Jan	0.2920	0.1344	0.4798	1.1223	0.5086
Feb	0.0198	0.7551	0.3156	0.5924	(0.1456)
Mar	0.2455	0.3713	0.0749	(0.1389)	0.2460
Apr	0.2841	0.1185	(0.4186)	(0.0983)	0.6576
May	0.5032	(0.0119)	0.0576	(0.0383)	1.0761
Jun	0.1974	0.3017	0.4746	0.8562	1.0992
Jul	0.1162	0.1041	0.0815	0.1442	0.7253
Aug	0.3290	0.4185	0.0234	0.3383	(0.3702)
Sept	0.1636	0.0048	(0.2949)	0.7695	0.2448

Appendix B (cont.): Raw Data Represented in the Graphs in Section Four

() => negative

MRS Fund Monthly Gain/Loss ($ Billion)

Plan: 25% Merrill Lynch Index Plan MRS Fund Invested

Month/Fiscal Year	1985	1986	1987	1988	1989
Oct	9.6000	10.6391	10.7750	10.7711	10.1261
Nov	0.2190	0.3044	0.4038	0.4501	0.0354
Dec	0.2058	0.3518	0.3420	0.4363	0.2223
Jan	0.2458	0.1620	0.3971	0.7362	0.3746
Feb	0.1115	0.4670	0.3184	0.4729	0.0498
Mar	0.2247	0.2789	0.2025	0.1134	0.2451
Apr	0.2450	0.1575	(0.0377)	0.1338	0.4510
May	0.3550	0.0952	0.1951	0.1641	0.6590
Jun	0.2039	0.2480	0.4026	0.6118	0.6686
Jul	0.1650	0.1531	0.2094	0.2580	0.4832
Aug	0.2710	0.3066	0.1816	0.3560	(0.0526)
Sept	0.1905	0.1069	0.0237	0.5725	0.2488

Plan: 100% Life Insurance (I) Plan MRS Fund Invested

Month/Fiscal Year	1985	1986	1987	1988	1989
Oct	9.6000	10.5767	10.6959	10.5353	10.0631
Nov	0.1768	0.1613	0.2761	0.3143	0.3366
Dec	0.1779	0.1620	0.2772	0.3154	0.3374
Jan	0.1895	0.1639	0.2802	0.3092	0.3357
Feb	0.1912	0.1652	0.2823	0.3115	0.3381
Mar	0.1926	0.1659	0.2835	0.3125	0.3390
Apr	0.1947	0.1679	0.2866	0.3160	0.3430
May	0.1965	0.1692	0.2887	0.3183	0.3455
Jun	0.1979	0.1699	0.2899	0.3194	0.3464
Jul	0.2000	0.1720	0.2931	0.3230	0.3505
Aug	0.2018	0.1614	0.2953	0.3253	0.3530
Sep	0.2033	0.1620	0.2965	0.3264	0.3539

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The purpose of this study was to investigate investment of military retirement system (MRS) funds in the private sector, as opposed to the current method of investing the funds within the Government, between 1985 and 1989, under assumptions of administrative and regulatory constraints; the timeframe was selected because in 1985 the Government began setting aside funds for future military retirement costs versus the pay-as-you-go method in previous years.

The study had three objectives: (1) identify administrative factors that result from modifying the current MRS to an MRS funded by private sector investments; (2) identify regulatory constraints that could apply to the investment of military retirement funds in the private sector; (3) evaluate the MRS flow of funds under several investment plans that reflect assumptions of administrative and regulatory constraints.

Administrative assumptions were based on the Federal Employee Thrift Savings Plan; regulatory assumptions were based on life insurance fund and private pension fund regulations.

The results from analyzing the MRS flow of funds suggested that between fiscal years 1985 to 1989, a stock index plan, and to a lesser extent, a corporate bond index plan, improved the cumulative investment returns of the MRS fund; the price for this improvement was periods of volatility resulting in short term losses on investment. A highly regulated plan such as the life insurance plan provided approximately the same investment returns as the current MRS investment approach with no volatility.

The results also suggested that improved investment returns may be achieved when less than 100 percent of the MRS fund was invested in the private sector; this method also reduced the negative effects of a volatile market.